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Lesson (1)
المعلومات والوسائط

Information and Media



1 Data, Information, Knowledge المعلومات، المعلومات، المعرفة

1 Data: Facts or matters represented using numbers, characters, or symbols.

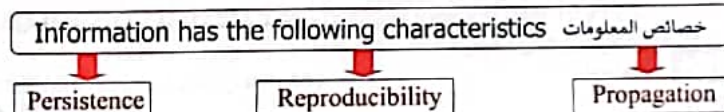
البيانات: هي حقائق تمثل باستخدام الأرقام أو الأحرف أو الرموز

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2 Information: Something that holds meaning or value for the recipient and serves as a basis for decision-making.

المعلومات: هي معنى أو قيمة للمتلقي وتستخدم لاتخاذ القرار

Unlike objects, information has no form. وعلى عكس الأشياء المادية، فالمعلومات ليس لها شكل أو كيان ثابت



1 Persistence: Information, once created, cannot be completely erased.

الاستمرارية: بمجرد إنشاء المعلومات لا يمكن محوها بالكامل

2 Reproducibility: Information can be easily copied in large quantities.

قابلية التكرار: إمكانية نسخ المعلومات بسهولة بكميات كبيرة

3 Propagation: Information is easy to convey and spread.

انتشار: من السهل توصيل المعلومات ونشرها

Information can easily spread through ("mass media") such as newspapers and television, as well as the internet.

يمكن أن تنتشر المعلومات بسهولة من خلال وسائل الإعلام الجماهيرية مثل الصحف والتلفزيون، وكذلك الإنترنت

3 Knowledge

Information that has been analyzed and systematized to aid in problem-solving.

المعرفة: هي المعلومات التي تم تحليلها وتنظيمها بشكل منهجي للمساعدة في حل المشكلات

4 Primary information and secondary information. المعلومات الأولية والمعلومات الثانوية

Primary information: Information obtained through

المعلومات الأولية: هي المعلومات التي يتم الحصول عليها من خلال

direct personal experience

التجربة الشخصية المباشرة

or acquired through research and experiments. أو عن طريق البحث والتجارب

Examples: Experimental reports, survey results, tabulations of questionnaire results, etc.

أمثلة: تقارير التجارب، نتائج الاستطلاعات، جداول نتائج الاستبيانات، إلخ

Secondary information:

Information not obtained directly by oneself, but acquired through a third party.

المعلومات الثانوية: هي المعلومات التي لا تحصل عليها بنفسك بشكل مباشر بل من خلال طرف ثالث

Examples: Books, newspapers, television, etc.



Note: Secondary information can sometimes differ from the original information or have interpretations added to it.

لاحظ: يمكن أن تختلف المعلومات الثانوية في بعض الأحيان عن المعلومات الأصلية — أو تحتوي على تفسيرات مضافة إليها

So, it is necessary to compare the obtained information from multiple perspectives with other information → لذا، من الضروري مقارنة المعلومات التي تم الحصول عليها من مصادر متعددة مع معلومات أخرى to determine the degree of its accuracy and reliability. This is called ("cross-checking"). — لتحديد مدى دقتها وموثوقيتها. هذه العملية تسمى بالتحقق المتبادل.

2 Media الوسائط

Media: Media for conveying information to people.

الوسائط: هي وسائل لنقل المعلومات إلى الناس

**2 Types of Media:** أنواع الوسائط

Expression media Propagation Transmission media Recording media

Name	Content	Example
1 Expression media	Media used as a means of expressing information.	Text, images, audio, video.
2 Propagation Transmission media	Media used as an intermediary for the transmission and communication of information.	Television, radio, newspapers, books, telephone, internet.
3 Recording media	Media used for recording and storing information.	Paper, USB drives, DVDs, cloud storage.

1 وسائط الإعلام التعبيرية: الوسائط المستخدمة كوسيلة للتعبير عن المعلومات. مثل النصوص، صور، صوت فيديو

2 وسائط النقل/الإرسال: الوسائط المستخدمة كوسيط لنقل وتبادل المعلومات. مثل التلفزيون، الراديو، الصحف، الكتب، الهاتف، الإنترنت

3 وسائط التسجيل: الوسائط المستخدمة لتسجيل وتخزين المعلومات. مثل الورق، محركات أقراص USB، أقراص DVD، والتخزين السحابي

Media Literacy:

The ability to accurately interpret information obtained from media.

الثقافة الإعلامية: هي القدرة على تفسير المعلومات التي تم الحصول عليها من وسائط بدقة

**Warm Up**

نحدي معلوماتك

Answer the following questions:

1 For the following items A to C, answer whether they are related to:

العناصر التالية من (1) إلى (ج)، أجب عما إذا كان منهم مرتبط بالمصطلحات التالية

[1] Data, [2] Information, or [3] Knowledge.

Write "1," "2," or "3" as your answer. اكتب 1، 2، 3 كإجابة لك

- a) Temperature and humidity values. قيم درجة الحرارة
b) Analysis results of temperature and humidity over the past 10 years.

نتائج تحليل درجة الحرارة والرطوبة على مدى السنوات العشر الماضية

- c) Weather forecast. توقعات الطقس والرطوبة

2 Choose one statement that is not suitable as a characteristic of information from the options A to D, and answer using the letters.

اختر عبارة واحدة غير مناسبة كخاصية للمعلومات من الخيارات (1) إلى (د)

- a) It has a form just like an object. لها شكل مثل الجسم العادي
b) The meaning or value changes depending on the recipient.

المعنى أو القيمة تتغير اعتماداً على المستلم

- c) It has the characteristic of persistence. لها خاصية الثبات
d) It has the characteristic of propagation. لها خاصية الانتشار

3 Choose the content related to the following sentences a to c from the group of words labeled A to C below, and answer using the letters.

اختر عبارة واحدة غير مناسبة كخاصية للمعلومات من الخيارات (1) إلى (ج) من مجموعة الكلمات المسماة من (1) إلى (ج) أدناه، أجب باستخدام الأحرف

- a) Even if you purchase a commercially available music CD, you are not allowed to make copies to distribute to friends.

حتى إذا قمت بشراء قرص موسيقي تجاري (CD) لا يُسمح لك بعمل نسخ لتوزيعها على الأصدقاء.

- b) Emails can be sent instantly overseas.

يمكن إرسال رسائل البريد الإلكتروني على الفور إلى الخارج

- c) Rumors about people and false information can persist indefinitely.

الشائعات حول الأشخاص والمعلومات الكاذبة يمكن أن تستمر إلى أجل غير مسمى

Word group: A) Persistence.

B) Reproducibility. C) Propagation.

مجموعة الكلمات: (أ) الثبات (ب) القدرة على الاستنساخ (ج) الانتشار

2 For the following media from (a) to (f), answer whether they are classified as: الوسائط التالية من (1) إلى (ج)، أجب عما إذا كانت مصنفة على أنها:

(1) Expression media, (2) Propagation/Transmission media, or (3) Recording media.

Write "1," "2," or "3" as your answer.

a) Television b) Cloud storage c) Photograph d) Internet e) Text character f) Book

2 What is the term for the ability to accurately interpret information obtained from media?

ما هو المصطلح الذي يشير إلى القدرة على تفسير المعلومات التي تم الحصول عليها من الوسائط بدقة؟

Explanation

الشرح

1 a: [1] b: [2] c: [3]

2 Unlike objects, information does not have form. Therefore, (A)

3 a: The characteristic of being easily copied is reproducibility. (B)

b: The characteristic of being able to be sent instantaneously is propagation. (C)

c: The characteristic of information, once created, that never disappears is persistence. (A)

2 a: 2 b: 3 c: 1 d: 2 e: 1 f: 2

2 Media literacy



Al-Faez Exercises

1 Choose the correct answer from the following:

1. Secondary information comes from

a. research b. experiments c. third parties d. surveys

2. Cross-checking means comparing information to ensure

a. beauty b. privacy c. speed d. accuracy

3. Media are tools for

a. eating b. traveling c. conveying information d. storing energy

4. Recording media are used for

a. talking b. recording c. painting d. speaking

5. Media literacy is the ability to

a. read books b. interpret media c. play music d. design posters

6. Data are represented using

a. numbers b. books c. colors d. signals

7. Information holds

a. form b. time c. weight d. meaning

8. Information is used for

a. decoration b. games c. decision-making d. translation

9. Information has no

a. form b. color c. limit d. owner

10. Persistence means information cannot be

a. copied b. erased c. printed d. read

11. Reproducibility means information can be

a. deleted b. hidden c. copied d. limited

12. Propagation means information can be easily

a. destroyed b. reduced c. hidden d. spread

13. Information spreads through

a. games b. mass media c. machines d. schools

14. Knowledge is information that has been

a. analyzed b. deleted c. printed d. moved

15. Primary information is obtained through

a. reading b. guessing c. copying d. experience

2 Put (✓) or (x) in front of each of the following sentences:

1. Expression media include text, images, and audio. ()

2. Transmission media are used to send and communicate information. ()

3. Recording media are used for recording and storing information. ()

4. Cloud storage is an example of expression media. ()

5. Media literacy means the ability to accurately understand media information. ()

6. Data are facts represented using numbers, characters, or symbols. ()

7. Information has a physical form like objects. ()

8. Information provides meaning or value for the recipient. ()

9. Information can be completely erased after creation. ()

10. Persistence means information continues to exist once created. ()

11. Reproducibility allows information to be copied easily in large quantities. ()

12. Propagation makes information difficult to spread. ()

13. Mass media such as newspapers and TV help spread information. ()

14. Knowledge is formed when information is analyzed and systematized. ()

15. Primary information is obtained from other people's experiences. ()

16. Experimental reports and survey results are examples of primary information. ()

17. Secondary information is obtained directly through personal research. ()

18. Books and television are examples of secondary information sources. ()

19. Cross-checking helps ensure accuracy and reliability of information. ()

20. Media are tools for storing food and materials. ()

3 Complete the following with the suitable words in brackets:

(decision-making – Data – meaning – erased – form)

1. Data are facts or matters represented using numbers, characters, or symbols.
2. Information is something that holds or value for the recipient.
3. Information serves as a basis for
4. Unlike physical objects, information has no
5. Persistence means information, once created, cannot be completely

4 Write the scientific concept for each of the following:

1. Facts or matters represented using numbers, characters, or symbols.
2. Something that holds meaning or value for the recipient and is used for decision-making.
3. Information that has been analyzed and systematized to aid in problem-solving.
4. The characteristic of information that means it cannot be completely erased once created.
5. The characteristic of information that allows it to be easily copied in large quantities.
6. The characteristic of information that makes it easy to convey and spread.
7. Information obtained directly through personal experience, research, or experiments.
8. Information acquired through a third party, such as books or television.
9. The process of comparing information from multiple sources to check accuracy and reliability.
10. The ability to accurately interpret and understand information obtained from media.

5 Complete the following with the suitable words:

1. Reproducibility means information can be easily in large quantities.
2. Propagation means information is easy to and spread.
3. Information can easily spread through mass media such as
4. Knowledge is information that has been analyzed and
5. Primary information is obtained through direct personal or research.
6. Experimental reports and survey results are examples of information.
7. Secondary information is obtained through a party.
8. Comparing information from multiple perspectives to ensure accuracy is called
9. Media are tools used for information to people.
10. Media literacy means the ability to accurately information obtained from media.

Information Ethics



1 Information Ethics أخلاقيات المعلومات

- 1 **Information ethics:** The foundational concepts and attitudes necessary for conducting appropriate activities in the information society.

أخلاقيات المعلومات: هي المفاهيم والتوجيهات الأساسية اللازمة للقيام بأنشطة مناسبة في مجتمع المعلومات

This is regardless of the presence or absence of (laws).

هذا بغض النظر عن وجود أو عدم وجود القوانين

2 Points to consider when disseminating information:

نقاط يجب مراعاتها عند نشر المعلومات

- [1] **Characteristics of Information on the internet:** Information is easily (spread) and, once disseminated, it tends (not to disappear) easily.

خصائص المعلومات على الإنترنت: المعلومات تنتشر بسهولة وبمجرد انتشارها، فإنها لا تختفي بسهولة

[2] **Infringement of Others' Rights:** انتهاك حقوق الآخرين

- ⚡ You must not publicly share images or videos for which others hold the (copyright) without permission.

لا يجوز لك مشاركة الصور أو مقاطع الفيديو التي يمتلكها الآخرون بـ (حقوق النشر) دون الحصول على إذن

- ⚡ You must not leak the (personal information) of another person on the internet.

لا يجوز لك تسريب (المعلومات الشخصية) لشخص آخر على الإنترنت

- ⚡ You must not infringe upon others' (privacy). انتهاك خصوصية الآخرين

- ⚡ You must not post comments that slander or defame others or engage in (online bullying). لا يجوز لك نشر تعليقات تحتوي على تشهير أو تشويه سمعة الآخرين أو المشاركة في (التنمر عبر الإنترنت)

3 Geotag (Geotagging): العلامة الجغرافية

- Information that includes latitude and longitude embedded in photos and videos taken with smartphones and mobile phones.

المعلومات التي تتضمن خطوط الطول والعرض المضمنة في الصور ومقاطع الفيديو الملتقطة بالهواتف الذكية والهواتف المحمولة

- There is a risk of being identified, such as having your home pinpointed based on the location where the photo was taken.

هناك خطر التعرض للتحديد والكشف عن موقعك، مثل تحديد موقع منزلك بناءً على الموقع الذي تم التقاط الصورة فيه



1 Disinformation and rumors: المعلومات المضللة والشائعات

- False information that is deliberately spread or baseless rumors. معلومات كاذبة يتم نشرها عمدًا أو شائعات لا أساس لها



2 Problems that occur with smartphones and social medias

1 Social media: وسائل التواصل الاجتماعي

- Services that provide platforms where individuals can connect with each other on the internet.



وسائل التواصل الاجتماعي هي خدمات التي توفر منصات حيث يمكن للأفراد التواصل مع بعضهم البعض على الإنترنت.

2 Problems that occur with smartphones and social media

المشاكل التي تحدث مع الهواتف الذكية ووسائل التواصل الاجتماعي

[1] Internet addiction: إدمان الإنترنت

A state where one becomes excessively immersed in the internet to the extent of interfering with daily life.

حالة يصبح فيها الشخص منغمساً بشكل مفرط في الإنترنت إلى درجة تعطيل الحياة اليومية.



[2] Using smartphone while walking: استخدام الهاتف الذكي أثناء المشي

The act of using a smartphone while walking. فعل استخدام الهاتف الذكي أثناء المشي

[3] Cybercrime: الجريمة الإلكترونية

The misuse of computers and networks for criminal activities.

إساءة استخدام أجهزة الكمبيوتر في الأنشطة الإجرامية



[4] Identity theft: انتحال الشخصية

The act of a third party pretending to be a certain individual or organization to steal IDs or passwords.

قيام شخص آخر بانتحال شخصية فرد أو مؤسسة لسرقة هويات أو كلمات مرور

[5] Leakage of personal information: تسرب المعلومات الشخصية

When personal information that should remain confidential is disclosed to a third party.

عندما يتم الكشف عن المعلومات الشخصية التي يجب أن تظل سرية لطرف ثالث



Warm Up

تجدي معلوماتك

Answer the following questions:

- What is the term for the foundational concepts and attitudes necessary for conducting appropriate activities in the information society?

ما هو المصطلح الذي يشير إلى المفاهيم والتوجهات الأساسية اللازمة للقيام بأنشطة مناسبة في مجتمع المعلومات؟

- For the following statements A to D, mark "✓" if the statement is correct, and "x" if it is incorrect.

A) Social media is nothing more than a dangerous tool that causes trouble.

وسائل التواصل الاجتماعي ليست أكثر من أداة خطيرة تسبب المتاعب

B) There is a risk that your home address could be identified from geotags embedded in photos and videos. هناك خطر من أن يتم التعرف على عنوان منزلك من العلامات الجغرافية المضمنة في الصور ومقاطع الفيديو

C) You can write whatever you want on an anonymous bulletin board because no one can ever know who wrote it. يمكنك كتابة ما تريد على لوحة إعلانات مجهولة الهوية لأنه لا يمكن لأحد أن يعرف من كتبها

D) Be mindful that there are real people on the other side of the internet, and try to share information with consideration for their perspective.

كن مدركاً أن هناك أشخاصاً حقيقين على الجانب الآخر من الإنترنت، وحاول مشاركة المعلومات مع مراعاة وجهة نظرهم



Explanation

الشرح

- Information ethics.

A) Social media is a convenient tool on the internet that allows individuals to connect with each other. However, social media can be a dangerous tool if not used properly. Therefore, (x)

B) (✓)

C) Never post defamatory content, disinformation, or rumors, even anonymously.

Therefore, (x)

D) (✓)



Al-Faez Exercises

1 Choose the correct answer from the following:

- Using a smartphone while walking causes
a. focus b. safety c. accidents d. rest
- Cybercrime means using computers or networks for activities.
a. criminal b. business c. social d. artistic
- Identity theft involves stealing someone's
a. ideas b. IDs or passwords c. photos d. comments
- Leakage of personal information means revealing data to
a. friends b. teachers c. third parties d. family

5. Disinformation and rumors can lead to

- a. truth b. confusion c. safety d. silence

6. Information ethics involves the foundational necessary for proper behavior in the information society.

- a. laws b. devices c. concepts d. games

7. Information ethics applies regardless of the presence or absence of

- a. rules b. media c. rights d. laws

8. Internet information spreads easily and tends

- a. not to disappear b. to increase c. to disappear d. to stop

9. Sharing others' images or videos without permission violates

- a. freedom b. community c. friendship d. copyright

10. Revealing another person's personal data online violates their

- a. privacy b. account c. network d. status

11. Posting comments that insult others is a form of

- a. cybercrime b. friendship c. privacy protection d. online bullying

12. Geotagging means adding data to photos or videos.

- a. name b. color c. location d. time

13. Disinformation refers to information spread intentionally.

- a. true b. useful c. false d. secret

14. Social media are online platforms that allow individuals to

- a. sleep b. connect c. trade d. read

15. Spending too much time online to the point it affects daily life is called

- a. addiction b. learning c. privacy d. sharing

2 Put (✓) or (x) in front of each of the following sentences:

1. Using smartphones while walking can cause safety problems. ()
2. Cybercrime refers to crimes committed using computers or networks. ()
3. Identity theft means pretending to be someone else to steal information. ()
4. Leakage of personal information means keeping private data safe. ()
5. Posting false rumors online helps maintain a safe digital environment. ()
6. Respecting others' privacy and rights is part of information ethics. ()
7. Responsible online behavior helps create a healthy information society. ()
8. Information ethics provides the concepts and attitudes needed for correct behavior in the information society. ()
9. The application of information ethics depends on the existence of laws. ()
10. Information on the internet spreads easily and rarely disappears completely. ()
11. Once information is deleted from the internet, it completely vanishes forever. ()
12. Sharing copyrighted materials without permission is a violation of others' rights. ()
13. Publishing someone's personal data without consent respects their privacy. ()

14. Online bullying includes posting insulting or defamatory comments about others. ()

15. Geotagging in photos can reveal the location of the photographer. ()

16. Removing geotags from photos prevents others from knowing your location. ()

17. Disinformation refers to intentionally spreading false or baseless information. ()

18. Social media platforms allow people to connect and share content online. ()

19. Social media has no influence on communication between individuals. ()

20. Excessive internet use that harms daily life is known as Internet addiction. ()

3 Complete the following with the suitable words in brackets:

(information ethics – personal information – cybercrime – accidents – identity)

1. Using a smartphone while walking increases the risk of
2. The misuse of computers and networks for criminal acts is called
3. Pretending to be another person to steal IDs or passwords is known as
4. Disclosure of private data to unauthorized persons is called leakage of
5. Practicing respect for others' rights and privacy online is part of

4 Write the scientific concept for each of the following:

1. The foundational concepts and attitudes necessary for proper behavior in the information society.
2. A situation where internet use becomes excessive and interferes with daily life.
3. The act of sharing another person's images or videos without permission, violating their rights.
4. The embedding of latitude and longitude data in photos and videos taken with smartphones.
5. False or baseless information intentionally spread to mislead people.
6. The use of computers and networks to commit illegal acts.
7. The act of pretending to be another person or organization to steal IDs or passwords.
8. The disclosure of confidential personal data to unauthorized individuals or groups.
9. Online services that allow people to connect, communicate, and share information.
10. The act of posting comments that insult, defame, or harm others through the internet.

5 Complete the following with the suitable words:

1. Information ethics refers to the foundational concepts and attitudes necessary for proper behavior in the
2. Information ethics applies regardless of the presence or absence of
3. Information on the internet is easily and tends not to disappear.
4. Sharing photos or videos without permission violates
5. Revealing another person's personal information online violates their
6. Posting insulting comments about others is a form of
7. Geotagging refers to embedding and information in photos or videos.
8. False or baseless information spread intentionally is called

Personal Information



1 Personal Information

البيانات الشخصية

- 1 **Personal Information:** Any data or information related to a natural person who can be identified directly or indirectly by linking it with other data.

البيانات الشخصية: هي كل بيان أو معلومة تتعلق بشخص طبيعي محدد أو يمكن تحديده بشكل مباشر أو غير مباشر، من خلال الرابط مع بيانات أخرى

Example

name, address, date of birth, gender, phone number, national ID number, passport number, driving license, or any data that identifies psychological, health, economic identity.

مثال الاسم، العنوان، تاريخ الميلاد، النوع، رقم الهاتف، رقم بطاقة الرقم القومي، رقم جواز السفر، رخصة القيادة، أو أي بيانات تحدد الهوية النفسية أو الصحية أو الاقتصادية

Four Basic Items

البيانات الأساسية الأربعة

These are among the different types of personal information, name, address, date of birth, and gender.

وهي من أنواع المعلومات الشخصية، الاسم، العنوان، وتاريخ الميلاد، والنوع

Personal Identification Codes

أرقام الهوية الشخصية

These are such as on passports, driver's licenses, or National IDs.

هي الأرقام الموجودة على جوازات السفر أو رخص القيادة أو الرقم القومي

Special Care-Required Personal Information

البيانات الشخصية الحساسة

Information that requires careful handling to prevent prejudice and other disadvantages (for example, race, creed, social status, medical history, and criminal record).

المعلومات التي تتطلب التعامل معها بعناية لمنع التحيز وغيره من العيوب (على سبيل المثال، العرق، والعقيدة، والوضع الاجتماعي، والتاريخ الطبي، والسجل الجنائي)

2 Act on the Protection of Personal Information

قانون حماية البيانات الشخصية

A law that stipulates the proper handling of personal information.

قانون يحدد القواعد الأساسية لجمع ومعالجة وتخزين ونقل البيانات الشخصية



3 Provision of Personal Information to Third Parties

تقديم البيانات الشخصية لأطراف ثالثة

- The Act on the Protection of Personal Information states that one cannot provide the personal information of an individual to a third party without the individual's consent.
- ينص قانون حماية المعلومات الشخصية على أنه لا يجوز جمع أو معالجة أو مشاركة البيانات الشخصية إلا بعد موافقة صريحة من صاحب البيانات

However, in the following cases, it is permissible to provide personal information without obtaining the individual's consent.

ومع ذلك، في الحالات التالية يجوز تقديم المعلومات الشخصية دون الحصول على موافقة الفرد:

- 1 When provision is based on laws and regulations.
عندما يكون التزويد مستنداً إلى قوانين ولوائح
- 2 When necessary for the protection of national security or public interest.
عندما يكون ذلك لازماً لحماية الأمن القومي أو مصلحة عامة
- 3 When necessary for the protection of human life, body, or property.
عندما يكون ذلك ضرورياً لحماية حياة شخص أو صحته أو ممتلكاته
- 4 When especially necessary for public health or the healthy development of children.
ما يكون ذلك ضرورياً بشكل خاص للصحة العامة أو النمو الصحي للأطفال
- 5 When cooperating with national or local governments, etc.
عند التعاون مع الحكومات الوطنية أو المحلية، إلخ

2 Protection of Privacy and Image Rights

حماية الخصوصية وحقوق الصورة

1 Right to Privacy:

الحق في الخصوصية

The right of an individual to protect personal information that the individual does not want others to know.

حق الفرد في حماية المعلومات الشخصية التي لا يرغب في أن يعرفها الآخرون



2 Image Rights:

حقوق الصورة

The right of an individual to prevent others from photographing or using their face or appearance without permission.

حق الفرد في منع الآخرين من تصوير وجهه أو مظهره أو استخدامها دون إذن



3 Publicity Rights:

حقوق الدعاية

A right that protects the economic interests of celebrities in their likeness, among other things.

حق يحمي المصالح الاقتصادية للمشاهير في صورتهم، من بين أمور أخرى



- These rights are recognized not by law but through court (precedents).

هذه الحقوق لا تُعترف بها بموجب القانون، بل من خلال السوابق القضائية (أحكام المحاكم السابقة)

3 Protection of Personal Information in Corporations and Organizations

حماية البيانات الشخصية في الشركات والمنظمات



1 Privacy policy: سياسة الخصوصية

A policy that stipulates how companies and organizations manage personal information.

هي السياسة التي تضعها الشركات لتوضيح كيفية جمع ومعالجة وحماية بيانات العملاء

2 Personal Data Protection Center License: ترخيص مركز حماية البيانات الشخصية

The license obtained by companies from the regulatory authority (Personal Data Protection Center) to ensure compliance with the law.

الترخيص الذي تحصل عليه الشركات من الهيئة التنظيمية (مركز حماية البيانات الشخصية) لضمان الالتزام بالقانون



3 Prior Approval System: نظام الموافقة المسبقة

A method in which a provider does not collect user data or offer a service to a user unless prior consent is given.

الترخيص الذي تحصل عليه الشركات من الجهة المنظمة (مركز حماية البيانات الشخصية) للتأكد من التزامها بالقانون

4 Objection System: نظام الاعتراض

A method in which a service provider continues to offer a service to the user until the user requests the provider to discontinue the service.

طريقة يستمر فيها مزود الخدمة في تقديم الخدمة للمستخدم حتى يطلب المستخدم من المزود إيقاف الخدمة

Warm Up تحدى معلوماتك

1 Answer the following questions:

- Choose all the items from A to D that can be considered personal information as defined by the Act on the Protection of Personal Information.
 - Email address
 - Fingerprint data
 - Address of a deceased person
 - Passport number
- The following statements A to D describe personal information and privacy. Mark "✓" if the statement is appropriate, and "x" if it is inappropriate.
 - If everyone in a photo is your family member, you can upload group photos to social media without permission.
 - Posting information such as the economic status or health status of a person on social media without his permission, thinking it might aid the investigation, is not a violation of the Act on the Protection of Personal Information.

- Although a driver's license number or a National ID Number consists merely of a sequence of digits, it can be considered personal information because it allows for the identification of an individual when combined with other information.
- It is acceptable to print a photo of your favorite celebrity on a T-shirt yourself and sell the T-shirt online.



Explanation الشرح

- Personal information refers to information concerning a living individual. Information about deceased individuals is not considered to be personal information. Therefore, A, B, and D
 - Uploading a person's photo to the internet or social media without their permission constitutes a violation of image rights. Therefore, (x)
 - Past criminal records and medical histories are referred to as special care-required personal information. As a general rule, they should not be provided to third parties without the individual's consent. Therefore, (x)
 - Personal information refers to data related to a living individual and includes information that can be used to identify an individual when combined with other information. Therefore, (✓)
 - The likeness of famous people (such as celebrities or athletes) holds economic value, and one should not sell that likeness for profit without permission. Therefore, (x)



Al-Faez Exercises

1 Choose the correct answer from the following:

- Personal information means data related to a person who can be identified or indirectly.
 - visually
 - directly
 - socially
 - emotionally
- Name, address, date of birth, and gender are called
 - Key Items
 - Main Data
 - Four Basic Items
 - Core Details
- are known as Personal Identification Codes.
 - Numbers on passports
 - national IDs
 - Access Codes
 - both a and b
- Information such as is called Special Care-Required Personal Information.
 - medical history
 - criminal record
 - both a and b
 - Safe Data
- The law that defines proper handling of personal information is called the
 - Privacy Law
 - Data Security Act
 - Act on the Protection of Personal Information
 - Information Safety Law
- Providing personal data to others without consent is generally
 - Allowed
 - Illegal
 - Encouraged
 - Ignored

7. Providing data without consent is allowed when it is based on
 a. Law b. Choice c. Privacy d. Contract
8. Data sharing is allowed to protect human
 a. rights b. life c. identity d. records
9. The right to keep personal information secret is called
 a. Image Rights b. Publicity Rights c. Right to Privacy d. Freedom Rights
10. Preventing others from using one's photo without permission refers to
 a. Image Rights b. Public Rights c. Privacy Rights d. Moral Rights
11. The right that protects celebrities' economic interests is called
 a. Privacy Rights b. Publicity Rights c. Legal Rights d. Personal Rights
12. Privacy and image rights are recognized through court
 a. judgments b. precedents c. laws d. systems
13. A policy that explains how organizations handle personal data is called a
 a. Security Plan b. Privacy Policy c. Data License d. Safety Rule
14. Companies need a license from the Personal Data Protection Center to ensure
 a. compliance b. freedom c. profit d. collection
15. A system where data is not collected without prior consent is called the
 a. Objection System b. Protection Plan c. Agreement Policy d. Prior Approval System

2 Put (✓) or (x) in front of each of the following sentences:

1. Personal information is data that can identify a person directly or indirectly. ()
2. Gender and address are examples of the Four Basic Items of personal information. ()
3. Passport numbers and national IDs are called Personal Identification Codes. ()
4. Special Care-Required Personal Information includes information such as race and medical history. ()
5. The Act on the Protection of Personal Information allows sharing data without any conditions. ()
6. Providing personal information to others without consent is always legal. ()
7. Data can be provided without consent when it is required for public safety or national security. ()
8. Protecting human life and property can justify sharing personal data without consent. ()
9. The right to privacy protects information that individuals prefer to keep secret. ()
10. Image rights allow others to use a person's photo freely without permission. ()
11. Publicity rights protect the economic interests of famous people. ()
12. Privacy and image rights are recognized through court precedents, not written laws. ()
13. A privacy policy defines how organizations manage personal data. ()
14. The Personal Data Protection Center License is optional for companies handling data. ()
15. The Prior Approval System requires consent before collecting user data. ()
16. The Objection System continues service unless the user requests it to stop. ()

17. Personal information includes psychological and economic identity. ()
18. The Four Basic Items are the only types of personal information recognized by law. ()
19. Special Care-Required Personal Information needs careful handling to prevent harm or discrimination. ()
20. Companies with a license from the Personal Data Protection Center are required to comply with the law. ()

3 Complete the following with the suitable words in brackets:

(precedents – Four Basic Items – directly – consent – Privacy Policy)

1. Personal information refers to any data related to a natural person who can be identified or indirectly.
2. Name, address, date of birth, and gender are known as the
3. Privacy and image rights are recognized through court
4. A policy that defines how companies manage personal data is called a
5. Personal information cannot be provided to a third party without the individual's

4 Write the scientific concept for each of the following:

1. The right of an individual to protect personal information they do not want others to know.
2. The right preventing others from using one's image or appearance without permission.
3. The right protecting the economic interests of famous people in their likeness.
4. A document or statement that explains how a company manages personal data.
5. A method that requires prior consent before collecting user data.
6. Data related to a natural person who can be identified directly or indirectly.
7. The four main items of personal data: name, address, date of birth, and gender.
8. Numbers such as passport, national ID, or driver's license numbers used to identify individuals.
9. Information such as race, medical history, or criminal record that requires careful handling.
10. The law that defines the proper handling of personal data.

5 Complete the following with the suitable words:

1. Data may be shared without consent when necessary for the protection of or property.
2. Sharing personal information is allowed when it is based on and regulations.
3. The right to keep private information secret is called the
4. Preventing others from using one's face or appearance without permission is part of ...
5. The right protecting the economic interests of celebrities is called
6. Companies must obtain a license from the Personal Data Protection Center to ensure with the law.
7. The system where data is not collected unless prior consent is given is called the
8. Numbers such as passport or national ID numbers are called

Intellectual Property Rights

1 Intellectual Property Rights حقوق الملكية الفكرية

- Intellectual Property Rights:** Rights that protect creations and ideas generated by human intellectual activities.

حقوق الملكية الفكرية: هي حقوق تحمي نتائج الإبداع الفكري البشري في المجالات الأدبية والفنية والعلمية التجارية

These rights are mainly divided into Industrial Property Rights and Copyrights.

تقسم هذه الحقوق بشكل رئيسي إلى حقوق الملكية الصناعية وحقوق التأليف والنشر

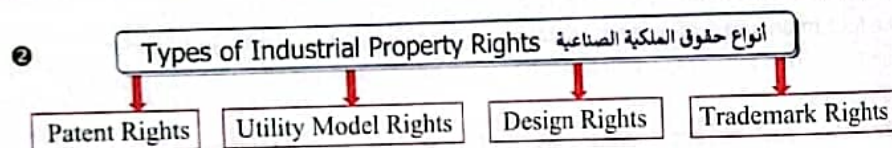
2 Industrial Property Rights حقوق الملكية الصناعية

- Industrial Property Rights:** Rights primarily related to the manufacturing of industrial or commercial products.

هي الحقوق التي تحمي الابتكارات والإبداعات المتعلقة بالنشاط الصناعي والتجاري

- This follows the principle in which rights come into effect once an application is filed with and registered by the (Egypt Patent Office). This is known as the (Formality) Principle.

ويشترط في هذه الحقوق التسجيل لدى الجهة المختصة (مثل مكتب براءات الاختراع المصري). حتى تتمتع بالحماية القانونية، وهو ما يُعرف بمبدأ (الشكلية)



Name	Subject of Rights	Protection Period
1 Patent Rights براءات الاختراع	Rights to advanced technological ideas and inventions.	20 years from the application
2 Utility Model Rights	Rights to the shape structure of a product.	7 years from the application
3 Design Rights	Rights to a design, such as the shape and patterns of a product.	10 years from the application (to be renewed once every 5 years)
4 Trademark Rights	Rights related items such as product names, logos, text, and sound.	10 years from the registration (Updated)

- 1 براءات الاختراع: تحمي الاختراعات التقنية الجديدة القابلة للتطبيق الصناعي. مدة الحماية 20 سنة من تاريخ التقديم
- 2 حقوق نموذج المنفعة: تحمي حلولاً تقنية بسيطة أو تحسينات عملية جديدة قابلة للتطبيق الصناعي. مدة الحماية 7 سنوات من تاريخ التقديم
- 3 حقوق التصميم: تحمي المظهر الخارجي للمنتج مثل الشكل وأنماط المنتج. مدة الحماية 10 سنوات من تاريخ التقديم (تجدد مرة واحدة كل 5 سنوات)
- 4 حقوق العلامة التجارية: العناصر المتعلقة بالحقوق مثل أسماء المنتجات والشعارات والنصوص والصوت. مدة الحماية 10 سنوات من تاريخ التسجيل (وتحديثها)

3 Copyrights حقوق المؤلف

- Copyrights:** Rights related to creative activities in the arts and cover works such as novels, movies, paintings, photographs, music, and computer programs.

حقوق تتعلق بالأنشطة الإبداعية في الفنون وتشمل أعمالاً مثل الروايات والأفلام واللوحات الفنية والصور الفوتوغرافية والموسيقى وبرامج الكمبيوتر

- It follows the (Non-Formality) Principle, under which rights are established at the moment a copyrighted work created, regardless of whether the creator is an amateur or a minor.

ينبع مبدأ عدم التسجيل، والذي بموجبه يتم إنشاء الحقوق في لحظة إنشاء عمل محمي بحقوق المؤلف، بغض النظر عما إذا كان المؤلف هاوياً أو قاصراً

2 Copyright Act. قانون حقوق المبدعين

A law that protects the rights of creators. قانون يحمي حقوق المبدعين

Rights of Creators حقوق المبدعين

- [1] Moral rights of creator: الحقوق المعنوية للمبدع

Rights that protect the personal interests of the creator.

هي الحقوق التي تحمي الصلة الشخصية بين المبدع ومصنفه

- [2] Copyrights (property rights): الحقوق المالية (حقوق الملكية)

Rights that protect the economic interests of the creator.

هي الحقوق التي تعطي المبدع الحق في الاستغلال الاقتصادي لمصنفه

3 Neighboring Rights: الحقوق المجاورة

Granted to performers such as singers, directors, and actors, as well as record companies and broadcasting organizations.

يتم منحها للمؤدين مثل المطربين والمخرجين والممثلين، وكذلك شركات التسجيل ومنظمات البث

4 Copyright protection period: مدة حماية حقوق المؤلف

The lifetime of the creator plus (50) years after their death.

هي عمر المؤلف زائد 50 سنة بعد وفاته

Copyright infringement:

انتهاك حقوق النشر

A general rule, when reproducing someone else's copyrighted work or using it on a website, it is necessary to obtain (permission) from the creator.

قاعدة عامة عند إعادة إنتاج عمل محمي بحقوق النشر مملوك لشخص آخر أو استخدامه على موقع ويب من الضروري الحصول على إذن من المبدع

Using a work without permission would constitute a (copyright infringement).

إن استخدام العمل بدون إذن من شأنه أن يشكل انتهاكاً لحقوق النشر.

Warm Up

تحدى معلوماتك

Answer the following questions:

1 Insert the appropriate terms for [1] to [6] to complete the following sentence.

The rights granted to a creator when they produce something through intellectual activity are called ([1]). ([1]) are primarily composed of ([2]), which contribute to the development of industry, and ([3]), which contribute to the development of culture. ([2]) are established under the ([5]) in which rights are granted upon approval after filing a notification with ([4]). On the other hand, ([3]) do not require reporting or registration, and the rights are granted at the time of creation. Furthermore, the protection period for ([3]) is ([6]) years after the death of the creator.

2 For the following statements concerning the laws and rights of information society, mark "✓" if the statement is appropriate, and "x" if it is incorrect.

- [1] Posting Taha Hussein's novel "The Days" on your website without permission does not constitute copyright infringement.
- [2] Downloading music or videos that are for sale while knowing that they have been illegally uploaded constitutes copyright infringement.
- [3] Posting the audio data of Beethoven's Symphony No. 5 "Fate" played exceptionally well by someone else on social media does not constitute copyright infringement.
- [4] Trademark rights conclude 10 years after registration with the Patent Office, but the rights can be maintained through renewal procedures.

Explanation

الشرح

- 1 [1] Intellectual Property Rights [4] Egypt Patent Office
[2] Industrial Property Rights [3] copyrights [5] Formality Principle [6] 50
- 2 [1] Novelists like Taha Hussein can be used copyright-free as over 50 years have passed since their death. Therefore, (✓)
[2] Downloading music or movies while knowing they have been illegally uploaded constitutes copyright infringement. Therefore, (✓)

[3] Musical compositions by Beethoven, Mozart, and similar composers are no longer under copyright protection, as more than 50 years have passed since their death. However, performers and record companies have neighboring rights, so it is necessary to verify the usage permissions. Therefore, (x)

[4] Trademark rights conclude 10 years after registration with the Patent Office, but the rights can be maintained for an additional 10 years through renewal procedures. Therefore, (✓)



Al-Faez Exercises

1 Choose the correct answer from the following:

- (1) Intellectual Property Rights protect creations and ideas from
a. Nature b. Robots c. Machines d. Human activities
- (2) Main categories of Intellectual Property Rights are
a. Industrial and Copyrights b. Technical and Moral
c. Patent and Design d. Legal and Scientific
- (3) Industrial Property Rights relate mainly to
a. Agriculture b. Medicine c. Education d. Manufacturing
- (4) Principle applied to Industrial Property Rights is
a. Formality b. Creativity c. Ownership d. Morality
- (5) Rights become effective after registration at the
a. Police Office b. Egypt Patent Office c. Copyright Office d. Trade Center
- (6) Patent Rights protect
a. Logos b. Songs c. Technological ideas d. Photos
- (7) Protection period for Patent Rights
a. 10 years b. 7 years c. 5 years d. 20 years
- (8) Utility Model Rights focus on a product's
a. Shape and structure b. Color c. Trademark d. Sound
- (9) Design Rights cover
a. Songs b. Product patterns c. Programs d. Books
- (10) Trademark Rights relate to
a. Music b. Ideas c. Product names and logos d. Inventions
- (11) Copyrights follow the principle of
a. Ownership b. Non-Formality c. Formality d. Renewal
- (12) Copyright Act protects
a. Industrial property b. Creators' rights c. Trademark owners d. Patent holders
- (13) Moral rights protect
a. Economic interests b. Personal interests c. Design structure d. Patent fees

(14) Copyright protection lasts for lifetime plus

- a. 20 years b. 70 years c. 50 years d. 30 years

(15) Using a work without permission leads to

- a. Ownership b. Registration c. Infringement d. Renewal

2 Put (✓) or (x) in front of each of the following sentences:

- (1) Intellectual Property Rights protect ideas and creations from human intellectual activities. ()
- (2) Industrial Property Rights are mainly related to agricultural production. ()
- (3) Intellectual Property Rights are divided into Industrial Property Rights and Copyrights. ()
- (4) Industrial Property Rights become effective automatically when the product is made. ()
- (5) The principle of Industrial Property Rights is known as the Formality Principle. ()
- (6) The Egypt Patent Office is responsible for registering Industrial Property Rights. ()
- (7) Patent Rights protect logos and names of companies. ()
- (8) The protection period for Patent Rights is 20 years from the date of application. ()
- (9) Utility Model Rights concern the shape and structure of products. ()
- (10) The duration of protection for Utility Model Rights is 10 years. ()
- (11) Design Rights protect shapes and patterns of products. ()
- (12) Design Rights can be renewed every 10 years. ()
- (13) Trademark Rights cover product names, logos, text, and sound. ()
- (14) The protection period for Trademark Rights is 10 years from registration. ()
- (15) Copyrights apply only to professional artists. ()
- (16) Copyrights follow the Non-Formality Principle. ()
- (17) The Copyright Act aims to protect the rights of creators. ()
- (18) Moral rights safeguard the creator's financial interests. ()
- (19) Copyright protection lasts for the creator's lifetime plus 50 years after death. ()
- (20) Using someone's copyrighted work without permission is considered copyright infringement. ()

3 Complete the following with the suitable words in brackets:

(Non-Formality – inventions – 50 – logos – arts)

- 1- Trademark Rights are related to items such as product names,, text, and sound.
- 2- Copyrights cover creative activities in the and protect works such as novels, movies, and computer programs.
- 3- Copyrights follow the Principle, under which rights are established at the moment a work is created.
- 4- Copyright protection lasts for the lifetime of the creator plus years after their death.
- 5- Patent Rights protect advanced technological ideas and

4 Write the scientific concept for each of the following:

- (1) Rights that protect creations and ideas generated by human intellectual activities.
- (2) Rights mainly related to the manufacturing of industrial or commercial products.
- (3) Principle stating that rights take effect once an application is filed and registered by the authority.
- (4) Government office responsible for registering Industrial Property Rights in Egypt.
- (5) Rights that protect advanced technological ideas and inventions.
- (6) Rights that protect the shape and structure of a product.
- (7) Rights that protect designs such as shapes and patterns of products.
- (8) Rights related to product names, logos, text, and sound.
- (9) Principle under which rights are established at the moment a work is created, without formal registration.
- (10) Rights granted to individuals or organizations that communicate or transmit copyrighted works.

5 Complete the following with the suitable words:

- 1- Intellectual Property Rights protect creations and ideas generated by
- 2- Intellectual Property Rights are mainly divided into Industrial Property Rights and
- 3- Industrial Property Rights are primarily related to the manufacturing of industrial or products.
- 4- Industrial Property Rights follow the Principle.
- 5- According to the Formality Principle, rights come into effect once an application is filed and registered by the
- 6- Copyrights (property rights) protect the interests of the creator.
- 7- The protection period of Patent Rights is years from the application.
- 8- Utility Model Rights protect the structure of a product.
- 9- Design Rights protect the design, such as the shape and of a product.
- 10- Moral Rights protect the interests of the creator.

Utilization and Disclosure of Information

1 Utilization and Disclosure of Information

استخدام وكشف المعلومات

1 Purpose of Copyright: الغرض من حقوق المؤلف

A copyright aims to contribute to cultural development by ensuring the (fair use) of copyrighted works and the (protection of rights).

يهدف حقوق المؤلف إلى المساهمة في التطور الثقافي من خلال ضمان (الاستخدام العادل) للأعمال المحمية بحقوق المؤلف (وحماية الحقوق)

2 Exceptions استثناءات

Under the purpose of copyright, there are exceptions where the copyright can be limited to allow use without obtaining permission from the copyright holder.

تحت غرض حقوق المؤلف، هناك استثناءات يمكن فيها الحد من حقوق المؤلف للسماح بالاستخدام دون الحصول على إذن من صاحب حقوق المؤلف

Example:

Reproduction for private use, إعادة الإنتاج للاستخدام الخاص
reproduction within educational institutions, وإعادة الإنتاج داخل المؤسسات التعليمية
non-profit performances, etc. والعروض غير الربحية، إلخ

3 Quotation الاقتباس

The act of using a portion of another person's copyrighted work in your own copyrighted work.

هو عملية استخدام جزء من عمل محمي بحقوق المؤلف لشخص آخر في عملك المحمي بحقوق المؤلف

If certain requirements are met, portions of a copyrighted work can be quoted without obtaining permission from the author.

إذا تم استيفاء متطلبات معينة، يمكن اقتباس أجزاء من عمل محمي بطرق وقواعد الاقتباس بحقوق المؤلف دون الحصول على إذن من المؤلف

Quotation Methods and Rules طرق وقواعد الاقتباس

1 Your own copyrighted work takes precedence, while the quoted work is subordinate.

يجب أن يكون عملك المحمي هو الأساس، بينما يكون العمل المقتبس منه تابعاً له.

(Your own copyrighted work is the subject.) (عملك المحمي بحقوق المؤلف هو الموضوع الرئيسي)

2 There must be a necessity to engage in quotation. يجب أن تكون هناك ضرورة للاقتباس



1 Ensure that the quoted material is clearly identifiable by enclosing it in quotation marks.

تأكد من إمكانية التعرف على المادة المقتبسة بوضوح عن طريق وضعها بين علامتي اقتباس

2 The source is clearly specified. يجب تحديد المصدر بوضوح

3 Do not alter the quoted material. يجب عدم تغيير المادة المقتبسة



4 Setting the duration of protection تحديد مدة الحماية

The economic rights of the author expire (50) years after the death of the creator.

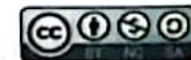
تنتهي الحقوق الاقتصادية للمؤلف بعد (50) عاماً من وفاة المبدع

5 Creative Commons License (CC License) ترخيص المشاع الإبداعي

A mark indicating the conditions for using copyrighted works.

علامة تشير إلى شروط استخدام الأعمال المحمية بحقوق النشر

Types of Creative Commons Licenses أنواع تراخيص المشاع الإبداعي



Mark	Condition	Content
1	Credit to creator (BY)	Display the title of the work and name of the creator.
2	Non-commercial (NC)	Do not use for (commercial) purposes.
3	No derivatives (ND)	Do not alter the original copyrighted work.
4	Same terms for adaptations (SA)	Publish under the same combination of licenses as the original work.

1 علامة تشير لفضل المبدع. الشرط: عرض عنوان العمل واسم المؤلف

2 علامة غير تجارية. الشرط: لا تستخدم لأغراض تجارية

3 علامة لا مشتقات. الشرط: لا تغير العمل المحمي بحقوق المؤلف الأصلي

4 علامة نفس الشروط. الشرط: انشر تحت نفس مجموعة التراخيص للعمل الأصلي

Warm Up

تحدى معلوماتك

Answer the following questions:

1 Choose all statements that allow for the use of copyrighted works without permission as an exception from the options A to D below, and answer using the letters.

- A) I copied the materials and distributed them to students in my social studies class.
- B) I copied commercially available music CDs and distributed them to friends.
- C) We charged an admission fee and performed a K-pop medley at our band's regular concert.
- D) I quoted a section of a book when writing a report.

Choose all statements that correctly describe the method and rules of quotations from the options A to D below, and answer using the letters.

- A) Even when quoting, it is always necessary to obtain permission from the creator.
 B) There is a necessity to quote, and the portion being cited is subordinate.
 C) Clearly indicate the quoted material by enclosing it in quotation marks.
 D) Regardless of the reason, you must not modify the material you are quoting.

When publishing a photo you took on a web page, you want to allow others to use it on the conditions that "the name of the photographer and the title of the work are displayed" and "the work is not altered." At this time, choose all the Creative Commons licenses that should be displayed in combination from the options A to D below, and answer using the letters.

(A)



(B)



(C)



(D)



Explanation

الشرح

- 1 A) The use of copyrighted works in the course of teaching falls under reproduction in educational institutions and works can therefore be utilized without obtaining permission from the copyright holder.
 B) Copying commercially available CDs and distributing them to friends does not qualify as reproduction for personal use and constitutes copyright infringement.
 C) Since an admission fee is charged and the usage does not fall under the condition of a performance not for profit, this usage constitutes a copyright infringement.
 D) In the case of quotation, a copyrighted work can be used in one's own creation without obtaining permission from the creator of the other work. Therefore, A and D

2 B, C, D

3 A) represents display, B) represents non-commercial, C) represents no derivative works, and D) represents same terms for adaptations. Therefore, A and C



Al-Faez Exercises

1 Choose the correct answer from the following:

- 1- The "BY" mark in Creative Commons stands for
 a. business use b. by creator c. basic rights d. credit to creator
 2- The "NC" mark means the work cannot be used for purposes.
 a. commercial b. private c. legal d. public

3- The "ND" mark requires no of the original work.

- a. copy b. sale c. use d. change

4- The "SA" mark requires adaptations to use the license terms.

- a. same b. new c. limited d. old

5- All Creative Commons marks are used to guide of works.

- a. usage b. destruction c. creation d. translation

6- Copyright aims to promote cultural development through fair use and

- a. privacy b. sharing c. protection of rights d. quotation

7- Limiting copyright to allow use without permission applies in cases.

- a. illegal b. exceptional c. regular d. private

8- Reproduction for private use is an example of a copyright

- a. violation b. exception c. license d. limitation

9- Using part of another's work in your own is called

- a. quotation b. citation c. adaptation d. translation

10- In quotation, your own work must be

- a. subordinate b. shorter c. primary d. secondary

11- Quotation marks are required to make quoted material

- a. clear b. shorter c. optional d. visible

12- The source of quoted material must be

- a. hidden b. deleted c. changed d. specified

13- Alteration of quoted material is

- a. allowed b. optional c. prohibited d. required

14- Economic rights of an author last for years after death.

- a. 25 b. 40 c. 70 d. 50

15- A Creative Commons License indicates the for using works.

- a. price b. conditions c. date d. author

2 Put (✓) or (x) in front of each of the following sentences:

- 1- Changes to the quoted content are acceptable if they improve clarity. ()
 2- The author's economic rights last for 50 years after their death. ()
 3- Creative Commons Licenses are used to indicate conditions for using copyrighted works. ()
 4- The "BY" mark in a Creative Commons License means "Buy rights." ()
 5- The "NC" condition allows the use of works for commercial purposes. ()
 6- The "ND" condition prohibits making changes to the original work. ()
 7- The "SA" condition requires sharing adaptations under the same license terms. ()
 8- The duration of protection for moral rights is limited to 25 years. ()
 9- Copyright laws aim to balance cultural progress and author protection. ()
 10- Creative Commons Licenses remove all copyright restrictions completely. ()
 11- Copyright contributes to cultural development by ensuring fair use and protection of rights. ()

- 12- Copyright completely prohibits others from using any part of a copyrighted work. ()
- 13- Reproduction for private use is an accepted exception under copyright law. ()
- 14- Educational institutions may reproduce copyrighted material for non-profit purposes. ()
- 15- Non-profit performances are not considered exceptions to copyright restrictions. ()
- 16- Quotation involves using another's entire copyrighted work as your own. ()
- 17- A quoted work must always remain secondary to your own copyrighted work. ()
- 18- Necessity to quote must be present for the quotation to be considered fair. ()
- 19- Quoted material can be mixed with the original text without quotation marks. ()
- 20- The source of a quotation must be clearly identified. ()

3 Complete the following with the suitable words in brackets:

(commercial – quotation – 50 – precedence – alteration)

- 1- The act of using a portion of another person's copyrighted work in your own is called ...
- 2- The "NC" mark means the work cannot be used for purposes.
- 3- The "ND" mark means that no of the original work is allowed.
- 4- In quotation, your own copyrighted work must take over the quoted work.
- 5- The economic rights of an author expire years after the creator's death.

4 Write the scientific concept for each of the following:

- 1- A Creative Commons condition that requires users to give proper credit to the creator.
- 2- A Creative Commons condition that forbids modifying or altering the original work.
- 3- A legal protection that ensures fair use and safeguards the rights of creators to promote cultural development.
- 4- A situation in which copyrighted material can be used without obtaining permission from the copyright holder.
- 5- The act of using a portion of another person's copyrighted work within your own work under specific rules.

5 Complete the following with the suitable words:

- 1- A Creative Commons License shows the for using copyrighted works.
- 2- The "BY" mark means giving to the creator.
- 3- Copyright aims to contribute to cultural development by ensuring the fair use of works and the of rights.
- 4- Exceptions to copyright allow use without obtaining from the copyright holder.
- 5- Reproduction for private use and reproduction within educational institutions are examples of copyright
- 6- Quotation must be done only when there is a real for it.
- 7- Quoted material must be clearly identifiable by enclosing it in marks.
- 8- The of the quoted material must always be clearly specified.
- 9- Quoted material must not be or changed in any way.
- 10- The "SA" mark means publishing adaptations under the license terms as the original.

Lesson (1)

تهديدات وإجراءات مواجهة أمن المعلومات

Threats and Countermeasures in Information Security ①

1 Information Security أمن المعلومات

1 Information Security

The act of properly managing information and keeping it safe.

أمن المعلومات: هو عملية إدارة المعلومات بشكل صحيح والحفاظ عليها آمنة

2 The three essential elements of information security

العناصر الأساسية الثلاثة لأمن المعلومات

Confidentiality

Integrity

Availability

1 Confidentiality: السرية

A state in which only authorized individuals can access the information.

هي الحالة التي يمكن فيها فقط للأفراد المصرح لهم الوصول إلى المعلومات

2 Integrity: السلامة

A state in which the information is not destroyed, tampered with, or erased.

هي الحالة التي لم يتم فيها تدمير المعلومات أو العبث بها أو محوها

3 Availability: التوافرية

A state in which information can be accessed at any time when needed.

هي الحالة التي يمكن فيها الوصول إلى المعلومات في أي وقت عند الحاجة

2 Various threats to information security تهديدات متنوعة لأمن المعلومات

1 Unauthorized access الوصول غير المصرح به

When someone without permission gains access to a computer system.

عندما يتمكن شخص ما دون إذن من الوصول إلى نظام الكمبيوتر

2 Cracking الاختراق

The act of unlawfully accessing a system to tamper with, erase, or steal data.

الوصول الفعلي بشكل غير قانوني إلى النظام للتلاعب بالبيانات أو مسحها أو سرقتها

A person who commits such acts is called a (cracker).

ويطلق على الشخص الذي يرتكب هذه الأفعال اسم (المخترق)

3 Malware البرمجيات الخبيثة

A general term for malicious programs designed to harm computers.

مصطلح عام للبرامج الضارة المصممة لإلحاق الضرر بأجهزة الكمبيوتر

Infection can occur through websites, email attachments, USB drives, or networks.

يمكن أن تحدث الإصابة عبر مواقع الويب، أو مرفقات البريد الإلكتروني، أو محركات أقراص USB، أو الشبكات

1 Computer virus فيروس الكمبيوتر

A program designed to intentionally cause harm, such as destroying data or programs.
برنامج مصمم لإحداث ضرر بشكل متعمد، مثل تدمير البيانات أو البرامج

2 Trojan horse حصان طروادة

A program disguised as a legitimate one that infiltrates a system and quietly initiates attacks.
برنامج متكر على أنه برنامج شرعي، يتسلل إلى النظام ويبدأ الهجمات بهدوء

3 Worm الودة

A program that replicates itself and spreads across the internet like a worm, expanding the infection.
برنامج يسخن نفسه وينتشر عبر الإنترنت مثل الودة، مما يؤدي إلى توسيع نطاق الإصابة

4 Spyware برنامج التجسس

A program that collects personal information without the user's knowledge and sends it to third parties.
برنامج يقوم بجمع المعلومات الشخصية دون علم المستخدم وإرسالها إلى أطراف ثالثة

• Keylogger مسجل لوحة المفاتيح

Software that monitors and records keystrokes.

برنامج يراقب ويسجل ضغطات المفاتيح

• Adware برنامج الإعلانات

A program that displays unwanted advertisements without the user's consent.

برنامج يعرض إعلانات غير مرغوب فيها دون موافقة المستخدم

5 Ransomware برنامج الفدية

A program that renders data inaccessible and demands a ransom to restore access.
برنامج يجعل البيانات غير قابلة للوصول ويطلب فدية لاستعادة الوصول للبيانات

6 Cybercrime الجريمة الإلكترونية

Criminal acts committed over computer networks.
أفعال إجرامية ترتكب عبر شبكات الكمبيوتر

1 Violation of the Unauthorized Computer Access Law:

انتهاك قانون الوصول غير المصرح به للكمبيوتر

Illegally accessing a computer using someone else's user ID or password.

الوصول بشكل غير قانوني إلى جهاز كمبيوتر باستخدام معرف المستخدم أو كلمة المرور الخاصة بشخص آخر

2 Crimes involving computer or electronic records:

جرائم تتضمن الكمبيوتر أو السجلات الإلكترونية

Crimes involving tampering with stored data or unauthorized manipulation of devices.

جرائم تتضمن العبث بالبيانات المخزنة أو التلاعب غير المصرح به بالأجهزة

3 Network-based crimes: جرائم قائمة على الشبكة

Crimes committed using networks, such as fraud, defamation, or copyright infringement.

جرائم ترتكب باستخدام الشبكات، مثل الاحتيال أو التشهير أو انتهاك حقوق المؤلف



Warm Up

تحدي معلوماتك

Answer the following questions:

- Choose the one in which availability is compromised in terms of information security from the options A to C below:
 - A cyberattack caused a website to go down.
 - Incorrect data was entered due to a keyboard typing error.
 - Personal information was leaked due to a malware infection on the computer.
- Choose all actions that constitute a violation of the Unauthorized Computer Access Law from the options A to D below.
 - Illegally used another person's user ID and password to access a computer.
 - Stored a password that was obtained illegally on a computer.
 - Shared a friend's user ID and password with someone else without the friend's permission.
 - Published a website selling quasi-legal drugs or containing unlawful and inappropriate content.



Explanation

الشرح

- Information security consists of three elements: integrity, confidentiality, and availability.
 - When information becomes unavailable, availability is compromised.
 - When information is no longer accurate, integrity is compromised.
 - When unauthorized individuals can view the information, confidentiality is compromised. Therefore, the correct answer is **(A)**.
- Using a computer without having access rights constitutes unauthorized access and is prohibited under the Unauthorized Computer Access Law.
 - Storing a password obtained illegally for the purpose of unauthorized access is prohibited under the Unauthorized Computer Access Law.
 - Sharing someone else's password with a third party without valid reason or permission promotes unauthorized access and is also prohibited by law.
 - Publishing illegal content may fall under network-related crimes. Therefore, the correct answers are **A, B, and C**.



Al-Faez Exercises

1 Choose the correct answer from the following:

- The act of properly managing information and keeping it safe is called
 - Integrity
 - Availability
 - Information security
 - Confidentiality
- Ensuring that only authorized individuals can access information refers to
 - Confidentiality
 - Availability
 - Integrity
 - Protection

- 3- Preventing information from being destroyed or altered ensures
 a. Security b. Integrity c. Access d. Confidentiality
- 4- The ability to access information whenever needed is
 a. Confidentiality b. Integrity c. Safety d. Availability
- 5- Accessing a system without permission is known as
 a. Cracking b. Cybercrime c. Unauthorized access d. Hacking

2 Put (✓) or (x) in front of each of the following sentences:

- 1- Information security means managing and protecting information properly. ()
- 2- Confidentiality means information can be accessed by anyone at any time. ()
- 3- Integrity ensures that data remains accurate and unchanged. ()
- 4- Availability means information is accessible when needed. ()
- 5- Unauthorized access refers to legal entry into a system. ()
- 6- Cracking involves accessing systems lawfully for maintenance purposes. ()
- 7- A cracker is a person who unlawfully tampers with or steals data. ()
- 8- Malware is a general term for harmful software. ()
- 9- A computer virus is a harmless program that protects data. ()
- 10- A Trojan horse hides inside legitimate programs to attack systems. ()
- 11- A worm spreads through the internet by self-replication. ()
- 12- Spyware collects personal data with the user's consent. ()
- 13- A keylogger records keystrokes without the user knowing. ()
- 14- Ransomware encrypts data and demands payment for access. ()
- 15- Cybercrime includes only physical theft of computers. ()

3 Complete the following with the suitable words in brackets:

(safe - Trojan horse - authorized - ransomware - spyware)

- 1- Information security is the act of properly managing information and keeping it
 2- Confidentiality means only individuals can access the information.
 3- A program that disguises itself as legitimate software is called a
 4- Software that collects personal data without the user's knowledge is known as
 5- A program that makes data inaccessible and demands money to restore it is called ...

4 Write the scientific concept for each of the following:

- 1- The act of properly managing information and keeping it safe.
 2- The condition in which information remains accurate and unchanged.
 3- Unauthorized access to a computer system for the purpose of tampering or stealing data.
 4- A program that replicates itself and spreads through networks.
 5- A criminal act carried out over computer networks.



Threats and Countermeasures in Information Security ②

1 Passwords and Authentication

كلمات المرور والمصادقة

1 Password كلمة المرور

A string of characters used to verify that the user of a given user ID is the legitimate account holder.



سلسلة من الأحرف تستخدم للتحقق من هوية المستخدم وأنه هو صاحب الحساب الشرعي

2 Guidelines for creating passwords إرشادات لإنشاء كلمات المرور

Use a string that is as long as possible.



استخدم سلسلة أحرف طويلة قدر الإمكان

Combine uppercase letters, lowercase letters, numbers, and symbols.

اجمع بين الأحرف الكبيرة والصغيرة والأرقام والرموز

Do not use personal information such as your birthday, email address, or user ID.

لا تستخدم معلومات شخصية مثل تاريخ ميلادك أو عنوان بريدك الإلكتروني أو معرف المستخدم

Do not reuse passwords used for other services.

لا تعد استخدام كلمات المرور المستخدمة في خدمات أخرى

3 One-time-password كلمة المرور لمرة واحدة

A password that changes at regular intervals and can only be used once.

كلمة مرور تتغير على فترات منتظمة ولا يمكن استخدامها إلا مرة واحدة



4 Authentication المصادقة

The process of verifying the identity of a user on a computer or network.

عملية التحقق من هوية المستخدم على كمبيوتر أو شبكة

5 Types of authentication أنواع المصادقة

1 Knowledge-based authentication

2 Biometric authentication (Biometrics)

3 Possession-based authentication

4 Two-factor authentication

5 Two-step authentication

Name	Method الطريقة	Examples
1 Knowledge-based authentication	Authentication using information known only to the individual.	User ID and password, PIN code
2 Biometric authentication (Biometrics)	Authentication using physical or behavioral characteristics of the individual.	Fingerprint, Iris, Vein pattern, Handwriting
3 Possession-based authentication	Authentication using an item that the individual possesses.	IC card, One-time password, SMS-based verification

- 4 Two-factor authentication: A method that combines two different types of factors from "knowledge," "biometrics," and "possession" to perform authentication.
- 5 Two-step authentication: A method that performs authentication in two steps using two pieces of information from the same type of factor.

- 1 المصادقة القائمة على المعرفة: المصادقة باستخدام معلومات يعرفها الفرد فقط. مثل: معرف المستخدم وكلمة المرور، رمز PIN
- 2 المصادقة البيومترية: المصادقة باستخدام الخصائص الفيزيائية أو السلوكية للفرد. مثل: بصمة الإصبع، الفزحية، نمط الوريد، الخط اليد
- 3 المصادقة القائمة على الحيازة: المصادقة باستخدام عنصر يمتلكه الفرد. مثل: بطاقة ذكية، كلمة مرور لمرة واحدة، التحقق عبر الرسائل النصية القصيرة
- 4 المصادقة الثنائية: طريقة تجمع بين نوعين مختلفين من العوامل من "المعرفة" و"القياسات الحيوية" و"الحيازة" لإجراء المصادقة
- 5 المصادقة متعددة الخطوات: طريقة تجمع بين نوعين مختلفين من العوامل من "المعرفة" و"القياسات الحيوية" و"الحيازة" لإجراء المصادقة

2 Information Security Measures إجراءات أمن المعلومات

1 Access control التحكم في الوصول

A method of limiting access to computer systems or data so that only specific users, verified through authentication, are allowed to use them.

طريقة للحد من الوصول إلى أنظمة الكمبيوتر أو البيانات بحيث يسمح فقط لمستخدمين محددين، ويتم التحقق منهم من خلال استخدام المصادقة

2 Firewall جدار الحماية

A system installed at network entry points to prevent (unauthorized access) from outside and to stop (data leaks) from within.

نظام مثبت عند نقاط دخول الشبكة لمنع (الوصول غير المصرح به) من الخارج وللمنع (تسرب البيانات) من الداخل

3 Countermeasures against computer viruses إجراءات مواجهة فيروسات الكمبيوتر

Install (antivirus software) to remove or isolate viruses,

قم بتنصيب (برنامج مكافحة الفيروسات) لإزالة الفيروسات أو عزلها
and keep the virus definitions within the software up to date.

واحرص على تحديث تعريفات الفيروسات داخل البرنامج

Always keep the operating system (OS) and application software (updated) to prevent (security holes) (vulnerabilities) in the software.

احتفظ دائماً بنظام التشغيل وبرنامج التطبيق (محدثاً) لمنع (الثغرات الأمنية) في البرنامج.

Regularly create (backups) of your data.

انشئ (نسخاً احتياطية) لبياناتك بانتظام



Warm Up

تحدى معلوماتك

Answer the following questions:

- 1 Choose the one incorrect statement regarding password best practices from the options A to D below, and answer using the letter.
- A) Do not reuse the same password across multiple services.
- B) It is best to keep using the default password that was initially assigned.
- C) Combine letters, numbers, and symbols when creating a password.
- D) Avoid using easily guessable information such as your name or birthday.
- 2 Choose all correct statements about one-time passwords from the options A to D below, and answer using the letters.
- A) If a one-time password is leaked, it can easily lead to unauthorized access.
- B) Using a one-time password strengthens overall security.
- C) A one-time password has a limited usage time and becomes invalid after expiration.
- D) It can prevent unauthorized access using leaked passwords.
- 3 Choose the one correct example of biometric authentication from the options A to D below, and answer using the letter.
- A) Authentication using a user ID and password assigned to each individual
- B) Authentication using an SMS sent to a smartphone
- C) Authentication by scanning a fingerprint on a sensor
- D) Authentication using a one-time password
- 4 If a password can use the digits 0 to 9 and lowercase letters a to z, how many different combinations are there for a 3-character password? Give your answer in the form of a.

- ① If an initial password is assigned via email or memo, there is a possibility that the password has been leaked to a third party. Therefore, the initial password must be changed. The correct answer is **B**.
- ② A one-time password is a password that changes at fixed intervals and can only be used once. This strengthens security. The correct answers are **B, C, and D**.
- ③ Biometric authentication refers to the use of an individual's physical or behavioral characteristics for verification. Examples include fingerprint, iris, vein, or handwriting-based authentication. The correct answer is **C**.

Note: A is knowledge-based authentication, B is possession-based authentication, and D is also possession-based authentication.

- ④ There are 10 digits (0-9) and 26 letters (a-z), making 36 possible characters. Since each character in the password can be any of the 36, the total number of combinations for a 3-character password is $36 \times 36 \times 36 = 36^3$ combinations.



Al-Faez Exercises

① Choose the correct answer from the following:

- 1- A string of characters used to verify a legitimate user.
 - a. ID
 - b. Token
 - c. Code
 - d. Password
- 2- A password that changes regularly and can be used only once.
 - a. OTP
 - b. PIN
 - c. Passcode
 - d. Key
- 3- The process of verifying the identity of a user.
 - a. Authorization
 - b. Identification
 - c. Authentication
 - d. Verification
- 4- Authentication using information known only to the individual.
 - a. Biometric
 - b. Possession
 - c. Knowledge-based
 - d. Two-factor
- 5- Authentication using physical or behavioral characteristics.
 - a. Knowledge-based
 - b. Biometric
 - c. Possession
 - d. Two-step

② Put (✓) or (x) in front of each of the following sentences:

- 1- A password is a string of characters used to confirm a user's identity. ()
- 2- Passwords should be short and easy to remember. ()
- 3- Using a mix of letters, numbers, and symbols makes a password stronger. ()
- 4- Personal details like birthdays should be avoided in passwords. ()
- 5- Reusing the same password for multiple services increases security. ()
- 6- A one-time password can be used many times. ()

7- Authentication is the process of verifying who a user is.

- 8- Knowledge-based authentication depends on what a person knows.
- 9- Biometric authentication uses physical or behavioral traits.
- 10- Possession-based authentication requires an object owned by the user.
- 11- Two-factor authentication uses only one type of verification factor.
- 12- Two-step authentication uses two items from the same type of factor.
- 13- Access control allows any user to access all system data freely.
- 14- A firewall blocks unauthorized access and prevents data leaks.
- 15- Regular backups help protect data from loss or damage.

③ Complete the following with the suitable words in brackets:

(password – Authentication – once – backups – firewall)

- 1- A is a string of characters used to verify that the user of a given user ID is the legitimate account holder.
- 2- A one-time password is a password that changes at regular intervals and can only be used
- 3- using information known only to the individual is called knowledge-based authentication.
- 4- A system installed at network entry points to prevent unauthorized access is called a ...
- 5- Regularly creating of data helps protect against loss or damage.

④ Write the scientific concept for each of the following:

- 1- A string of characters used to verify that the user of a given user ID is legitimate.
- 2- A password that changes regularly and can be used only once.
- 3- The process of verifying the identity of a user on a computer or network.
- 4- A method of limiting access so that only specific authenticated users can use systems or data.
- 5- A system installed at network entry points to prevent unauthorized access and stop data leaks.

Threats and Countermeasures in Information Security ③

1 Fraudulent Billing الاحتيال بالفواتير

1 Fraudulent billing فاتورة احتيالية

A scam in which a person is billed for a fictitious service they have never used, with the intent to fraudulently extract money.

غاية احتيال يتم فيها إصدار فاتورة لشخص مقابل خدمة وهمية لم يستخدمها أبداً، وذلك بقصد الحصول على أموال بطريقة احتيالية.

2 One-click fraud الاحتيال بنقرة واحدة

A scam where clicking a URL in a website or email automatically triggers a message pretending a contract has been concluded, followed by an exorbitant payment demand.

احتيال يؤدي فيه النقر على رابط (URL) في موقع ويب أو بريد إلكتروني تلقائياً إلى رسالة تدعى أنه تم إبرام عقد، يليها طلب دفع مبالغ فيه.

2 Unauthorized Acquisition of Information الحصول غير المصرح به على المعلومات

1 Phishing التصيد

A scam that uses fake websites disguised as financial institutions or public agencies to steal personal information such as PINs or account details.

احتيال يستخدم مواقع ويب مزيفة متكررة على أنها مؤسسات مالية أو هيئات عامة السرق المعلومات الشخصية مثل رموز PIN أو تفاصيل الحساب.

2 Social engineering الهندسة الاجتماعية

A method of fraudulently obtaining information by exploiting human psychology, carelessness, or lack of awareness.

أسلوب للحصول على معلومات بطريقة احتيالية من خلال استغلال نفسية الإنسان أو الإهمال أو قلة الوعي.

1 Impersonation انتحال الشخصية

The act of pretending to be someone else such as making a phone call in their name to obtain information.

مواظفة بآلة شخص آخر، مثال إجراء مكالمة هاتفية باسم الشخص الآخر ← للحصول على معلومات.

2 Shoulder surfing التجسس المباشر

The act of peeking over someone's shoulder to steal passwords or PIN codes.

عملية إلقاء نظرة خاطفة على كتف شخص ما لسرقة كلمات المرور أو رموز.



3 Dumpster diving البحث في المهملات

The act of rummaging through trash to obtain discarded confidential information.

البحث في سلة المهملات للحصول على معلومات سرية تم التخلص منها.

3 Skimming التزوير

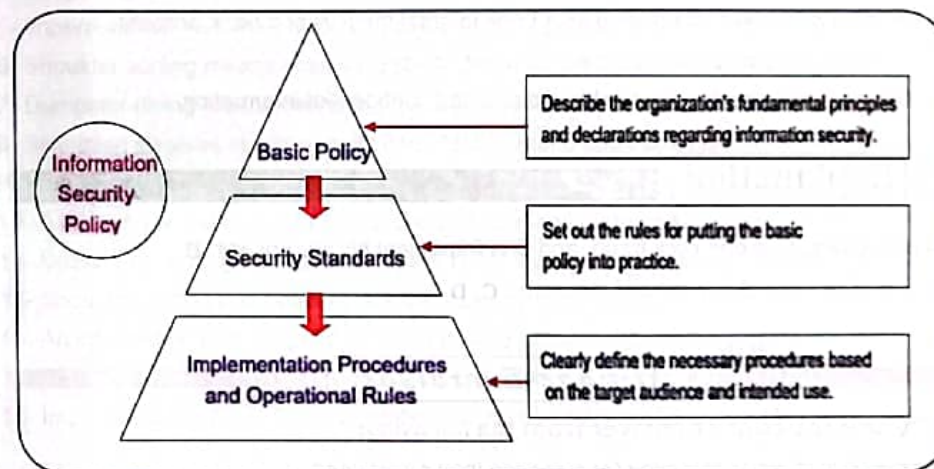
The act of illegally extracting data from someone's credit or debit card and using it to create a counterfeit card.

هو استخراج البيانات بشكل غير قانوني من بطاقة ائتمان أو الخصم، خاصة بشخص ما، واستخدام البيانات لإنشاء بطاقة مزورة.

3 Information security policy سياسة أمن المعلومات

Information Security Policy: A set of fundamental rules and guidelines established by a company or organization to maintain and protect information security.

سياسة أمن المعلومات: مجموعة من القواعد والمبادئ التوجيهية الأساسية التي تضعها شركة أو مؤسسة للحفاظ على أمن المعلومات وحمايتها.



● **Basic Policy:** Describe the organization's fundamental principles and declarations regarding information security.

● **Security Standards:** Set out the rules for putting the basic policy into practice.

● **Implementation Procedures and Operational Rules:** Clearly define the necessary procedures based on the target audience and intended use.

● السياسة الأساسية: تصف المبادئ الأساسية والإعلانات المتعلقة بأمن المعلومات الخاصة بالمنظمة.

● معايير الأمان: تحدد القواعد اللازمة لتطبيق السياسة عملياً.

● إجراءات التنفيذ وقواعد التشغيل: تحدد بوضوح الإجراءات اللازمة بناءً على الجمهور المستهدف والغرض المقصود.

Warm Up

تحدي معلوماتك

Answer the following questions:

- ❶ Choose the one that correctly describes phishing from the options A to D below, and answer using the letter.
 - A) A program that unknowingly steals personal information from inside a computer and sends it to a third party.
 - B) Pretending to be an email from a financial institution to lure someone to a fake website and illegally obtain their PIN or credit card number.
 - C) Clicking a URL once in a website or email triggers a false declaration of contract and a demand for a large payment.
 - D) Being billed for a service you don't recognize and being defrauded of money.
- ❷ Choose all that correspond to social engineering from the options A to D below, and answer using the letters.
 - A) Disabling access to data on a computer and demanding a ransom for its recovery.
 - B) Creating a fake website posing as a bank to steal the PIN of a bank account.
 - C) Eavesdropping on conversations with other users.
 - D) Rummaging through trash to obtain discarded confidential information.

Explanation

الشرح

- ❶ A is spyware, C is one-click fraud, and D is fraudulent billing. Answer: B
- ❷ A is ransomware, B is phishing. Answers: C, D



Al-Faez Exercises

❶ Choose the correct answer from the following:

- 1- A scam that charges someone for a service they never used.
 - a. Phishing
 - b. Fraudulent billing
 - c. Skimming
 - d. Impersonation
- 2- A scam triggered by clicking a URL that pretends a contract has been made.
 - a. Dumpster diving
 - b. One-click fraud
 - c. Shoulder surfing
 - d. Skimming
- 3- A fake website used to steal personal or financial data.
 - a. Phishing
 - b. Fraudulent billing
 - c. Impersonation
 - d. Firewall
- 4- A method that exploits human psychology to obtain confidential information.
 - a. Social engineering
 - b. Phishing
 - c. Skimming
 - d. Malware
- 5- The act of pretending to be another person to get information.
 - a. Shoulder surfing
 - b. Skimming
 - c. Dumpster diving
 - d. Impersonation

6- The act of secretly watching someone enter a password or PIN.

- a. Phishing
- b. Dumpster diving
- c. Shoulder surfing
- d. Skimming

7- Searching through discarded items to find confidential information.

- a. Dumpster diving
- b. Phishing
- c. Cracking
- d. Impersonation

8- Illegally copying data from someone's card to make a fake one.

- a. Phishing
- b. Skimming
- c. Impersonation
- d. Malware

9- A set of rules and guidelines for maintaining information security.

- a. Access control
- b. Security policy
- c. Backup
- d. Firewall

10- The section of a policy describing how basic security principles are applied.

- a. Security standards
- b. Basic policy
- c. Implementation procedures
- d. Rules

❷ Put (✓) or (x) in front of each of the following sentences:

- 1- Fraudulent billing involves billing someone for a service they never used. ()
- 2- One-click fraud automatically creates a contract after clicking a link. ()
- 3- Phishing uses fake websites to steal personal or financial information. ()
- 4- Social engineering relies on technical hacking tools only. ()
- 5- Impersonation involves pretending to be another person to gain information. ()
- 6- Shoulder surfing means observing someone to steal passwords or PINs. ()
- 7- Dumpster diving means searching through trash for confidential information. ()
- 8- Skimming involves stealing credit card data to make counterfeit cards. ()
- 9- Fraudulent billing is a legal and authorized way to collect payment. ()
- 10- A phishing website usually looks identical to a legitimate one. ()
- 11- Social engineering takes advantage of human weakness or carelessness. ()
- 12- Shoulder surfing and phishing are the same type of attack. ()
- 13- An information security policy defines how to protect organizational data. ()
- 14- Security standards are the fundamental principles of the organization. ()
- 15- Implementation procedures describe specific steps for applying security measures. ()

❸ Complete the following with the suitable words in brackets:

(contract – fictitious – personal – shoulder surfing)

- 1- Fraudulent billing is a scam in which a person is billed for a service they never used.
- 2- One-click fraud occurs when clicking a URL triggers a message pretending that a has been concluded.
- 3- Phishing uses fake websites disguised as financial institutions to steal information.
- 4- The act of peeking over someone's shoulder to steal passwords or PINs is called

Information Technology for Safety ①

1 Encryption التشفير

- ① **Encryption:** A method used when sending information to prevent it from being intercepted by anyone other than the intended recipient.



التشفير: طريقة تستخدم عند إرسال المعلومات لمنع اعتراضها من قبل أي شخص آخر غير المستلم المقصود

- ✎ The encrypted text is called (**ciphertext**), and the original, unencrypted text is called (**plaintext**).

ويطلق على النص المشفر اسم (النص المشفر)، ويُطلق على النص الأصلي غير المشفر (النص العادي)

② **Decryption:** فك التشفير

The process of converting ciphertext back into its original plaintext form.

عملية تحويل النص المشفر مرة أخرى إلى شكله الأصلي كنص عادي

③ **Key:** The specific procedure or data used for encryption and decryption.

المفتاح: الإجراء المحدد أو البيانات المستخدمة للتشفير وفك التشفير

2 Types of encryption أنواع التشفير

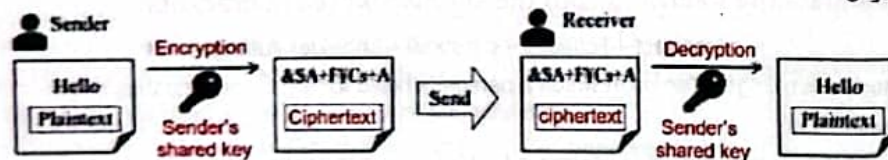
① **Symmetric key encryption:** التشفير بالمفتاح المتناظر

An encryption method where the same (**shared key**) is used for both encryption and decryption.

طريقة تشفير حيث يتم استخدام نفس (المفتاح المشترك) لكل من التشفير وفك التشفير

- ✎ The message is encrypted using the (**sender's shared key**) and decrypted using the (**sender's shared key**) that was sent in advance by the sender.

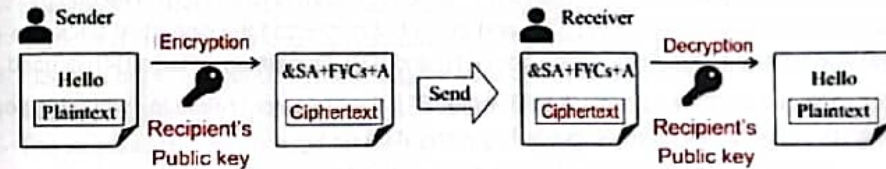
يتم تشفير الرسالة باستخدام (مفتاح المرسل المشترك) وفك تشفيرها باستخدام (مفتاح المرسل المشترك) الذي تم إرساله مسبقاً من قبل المرسل



- ② **Public key encryption:** An encryption method that uses a publicly shared encryption key (**public key**) and a private encryption key (**private key**).

التشفير بالمفتاح العام: طريقة تشفير تستخدم مفتاح تشفير مشترك بشكل عام (مفتاح عام) ومفتاح تشفير خاص (مفتاح خاص)

- ✎ The message is encrypted using the (**recipient's public key**), which was sent in advance,
يتم تشفير الرسالة باستخدام (المفتاح العام للمستلم) الذي تم إرساله مسبقاً،
✎ and decrypted using the (**recipient's private key**), which only the recipient possesses.
ويتم فك تشفيرها باستخدام (المفتاح الخاص للمستلم) الذي يمتلكه المستلم فقط

③ **Characteristics of Symmetric Key Encryption and Public Key Encryption:**

خصائص التشفير بالمفتاح المتناظر والتشفير بالمفتاح العام

	Symmetric Key Encryption التشفير بالمفتاح المتناظر	Public Key Encryption التشفير بالمفتاح العام
Merit المزايا	Compared to public-key encryption, encryption and decryption processing speed is (faster). (السرعة) معالجة التشفير وفك التشفير أسرع مقارنة بتشفير المفتاح العام	Since data can be decrypted by anyone with the key, a different shared key is needed for each sender. نظراً لأن أي شخص لديه المفتاح يمكنه فك تشفير البيانات، فإن كل مرسل يحتاج إلى مفتاح مشترك مختلف
Demerit العيوب	Because the public key can be shared freely, key management is easier. نظراً لأن المفتاح العام يمكن مشاركته بحرية، فإن إدارة المفاتيح أسهل	Compared to symmetric-key encryption, encryption and decryption processing speed is (slower). سرعة معالجة تشفير أبداً وفك تشفير أبداً مقارنة بتشفير المفتاح المتناظر

(4) **Session key method:** طريقة المفتاح الموقت

An encryption method that combines symmetric key encryption and public key encryption.
طريقة تشفير تجمع بين تشفير المفتاح المتناظر وتشفير المفتاح العام

Warm Up

تحدى معلوماتك

Answer the following questions:

- Complete the following sentences by filling in the blanks [1] to [4] with the appropriate terms.
When sending information, the technology used to prevent it from being leaked or tampered with by anyone other than the intended recipient is called ([1]). The original data before encryption is called ([2]), and the act of converting the ciphertext back into plaintext is called ([3]). Also, during both ([1]) and ([3]), something called a ([4]) is used.
- For each of the following items A to D, write "S" if the statement refers to symmetric key encryption, or "P" if it refers to public key encryption.
 - The encryption key is made public, and encryption is done using the public key while decryption is done with the private key.
 - Encryption uses separate keys held by the recipient - one for encryption and one for decryption.
 - Compared to the other method, the encryption and decryption processing speed is faster.
 - Compared to the other method, exchanging the key is more difficult.
- What is the name of the hybrid encryption method that combines symmetric key encryption and public key encryption?



Explanation

الشرح

- [1] encryption [2] plaintext [3] decryption [4] key
- A and B: The method in which encryption is performed with the recipient's public key and decryption with the recipient's private key is public key encryption.
C and D: Symmetric key encryption is faster than public key encryption, but since it uses the same key for both encryption and decryption, there is the issue of how to securely share the key with the recipient. Therefore, A: P, B: P, C: S, D: S
- Session key method



Al-Faez Exercises

1 Choose the correct answer from the following:

- The process of converting plaintext into ciphertext.
 - Decryption
 - Encoding
 - Encryption
 - Translation
- The process of converting ciphertext back into plaintext.
 - Encryption
 - Decryption
 - Encoding
 - Conversion
- The specific procedure or data used for encryption and decryption.
 - Key
 - Code
 - Cipher
 - Password

- The encryption method using the same shared key for both encryption and decryption.
 - Session key
 - Symmetric key
 - Public key
 - Dual key
- The encryption method using a public key and a private key.
 - Hybrid key
 - Shared key
 - Secret key
 - Public key

2 Put (✓) or (x) in front of each of the following sentences:

- Encryption is used to prevent unauthorized interception of information. ()
- Ciphertext refers to the original readable form of a message. ()
- Plaintext means the unencrypted, original form of information. ()
- Decryption changes ciphertext into plaintext. ()
- The same shared key is used for encryption and decryption in symmetric key encryption. ()
- In public key encryption, both encryption and decryption use the same key. ()
- The public key is kept secret and known only to the recipient. ()
- Public key encryption uses both a public and a private key. ()
- Symmetric key encryption has slower processing speed compared to public key encryption. ()
- The session key method combines symmetric key encryption and public key encryption. ()

3 Complete the following with the suitable words in brackets:

(decryption – encryption – session key – key – symmetric key)

- The method used to protect information from being intercepted by unauthorized persons is called
- The process of converting ciphertext back into plaintext is known as
- The specific data or procedure used for encryption and decryption is called a
- In encryption, the same shared key is used for both encryption and decryption.
- The encryption method that combines symmetric key encryption and public key encryption is the method.

4 Write the scientific concept for each of the following:

- A method used to prevent information from being intercepted by anyone other than the intended recipient.
- The process of converting ciphertext back into its original plaintext form.
- The specific procedure or data used for encryption and decryption.
- An encryption method that uses the same shared key for both encryption and decryption.
- An encryption method that uses a publicly shared encryption key and a private encryption key.

Information Technology for Safety ②

1 Digital Signature التوقيع الرقمي

1 Hash function: دالة التجزئة

A function that calculates a unique value based on the input data.

دالة تحسب قيمة فريدة بناءً على البيانات المُدخلة

The value generated by the hash function is called a (hash value).

القيمة الناتجة عن دالة التجزئة تسمى (قيمة التجزئة)

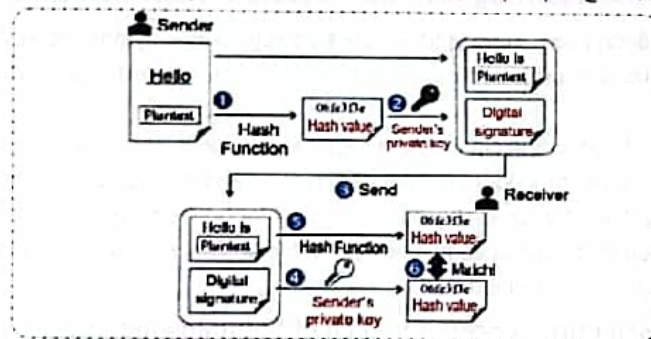
It is not possible to restore the original data from the hash value.

ليس من الممكن استعادة البيانات الأصلية من قيمة التجزئة

2 Digital signature (Electronic signature): التوقيع الرقمي

A technology that uses public key encryption and hash values → to prove that the transmitted data is from the sender and has not been tampered with.

تقنية تستخدم التشفير بالمفتاح العام وقيم التجزئة ← لإثبات أن البيانات المرسلة هي من المرسل ولم يتم العبث بها



Sender's Procedure إجراءات المرسل

1 Use a hash function to generate a (hash value) from the plaintext to be sent.

تستخدم دالة تجزئة لتوليد (قيمة تجزئة) من النص العادي المراد إرساله

2 Encrypt the hash value using the (sender's private key).

تشفر قيمة التجزئة باستخدام (المفتاح الخاص للمرسل)

This encrypted hash is called a (digital signature). هذا التشفير يسمى (التوقيع الرقمي)

3 Send both the plaintext and the digital signature to the recipient.

يرسل كل من النص العادي والتوقيع الرقمي إلى المستلم



Recipient's Procedure إجراءات المستلم

4 Use the (sender's public key) to decrypt the received digital signature and retrieve the original hash value.

يستخدم المفتاح العام للمرسل لفك تشفير التوقيع الرقمي المستلم واسترداد قيمة التجزئة الأصلية

5 Use the same hash function used in step 1 to generate a new (hash value) from the received plaintext.

تستخدم دالة التجزئة نفسها المستخدمة في الخطوة 1 لتوليد قيمة تجزئة جديدة من النص العادي المستلم

6 Compare the two (hash values) from steps 4 and 5.

تقارن قيمتي التجزئة من الخطوات 4 و 5

If they match, it proves that the message is from the sender and has

not been tampered with. إذا تطابقت فإنه يثبت أن الرسالة من المرسل ولم يتم العبث بها

3 Certification authority (CA): جهة التصديق

A trusted third-party organization that verifies whether a public key truly belongs to its claimed owner. منظمة طرف ثالث موثوقة تتحقق مما إذا كان المفتاح العام ينتمي حقاً إلى المالك المطروح

It issues (digital certificates) that include the public key and identifying information of the key owner. تُصدر (الشهادة الرقمية) التي تتضمن المفتاح العام ومعلومات تعريف صاحب المفتاح

2 SSL/TLS التوقيع الرقمي

SSL/TLS: A technology used to encrypt communication between a web server and a web browser.



تقنية تستخدم لتشفير الاتصال بين خادم الويب ومتصفح الويب

The (session key method) is used in this encryption.

يتم استخدام (طريقة مفتاح الجلسة) في هذا التشفير

The URL of an encrypted web page begins with "https://...".

يبدأ عنوان URL لصفحة الويب المشفرة بـ "https://..."

TLS (Transport Layer Security) was introduced as a more secure version of the originally used SSL (Secure Sockets Layer).

تم تقديم TLS (أمان طبقة النقل "Transport Layer Security") كإصدار أكثر أماناً من ←

SSL (طبقة المقابس الآمنة "Secure Sockets Layer") المستخدمة في الأصل ←

However, since the term "SSL" became widely recognized, the combined term SSL/TLS is often used.

ومع ذلك، ونظراً لأن مصطلح "SSL" أصبح معترفاً به على نطاق واسع، غالباً ما يتم استخدام المصطلح المجمع SSL/TLS

Warm Up

تحدى معلوماتك

Answer the following questions:

- For the following statements A to D about hash values, mark "✓" if the statement correct, or "x" if it is incorrect.
 - If one character in the original data is changed, only one character in the resulting hash value will change.
 - A digital signature is created by encrypting the hash value of the document to be sent with a private key.
 - It is difficult to restore the original message from its hash value.
 - Even if the documents being sent are different, the hash values obtained from the same hash function will always be the same.
- The following sentences describe the steps of creating a digital signature. Fill in the blanks [1] to [4] with the appropriate terms.

The sender generates a ([1]) based on the data they want to send and encrypts it using their ([2]). This is called a ([3]), and the sender sends both the data and the digital signature to the recipient. The recipient decrypts the received ([3]) using the sender's ([4]) to recover the original ([1]). The recipient also generates a ([1]) from the received data using the same hash function. If the two ([1]) values match, it proves that the data is from the sender and has not been tampered with.

- What is the name of the technology used to encrypt communication between a web server and a web browser?

Explanation

الشرح

- If even a single character in the original message is different, the resulting hash value becomes completely different. Therefore: **x**
 - ✓
 - ✓
 - If the message being sent is different, the resulting hash value will also be completely different even when using the same hash function. Therefore: **x**
- | | |
|--|-----------------|
| [1] hash value | [2] private key |
| [3] digital signature (electronic signature) | [4] public key |
- SSL/TLS

Al-Faez Exercises

1 Choose the correct answer from the following:

- The value generated by a hash function from input data is called
 - ciphertext
 - plaintext
 - hash value
 - key
- The technology that uses public key encryption and hash values to verify sender authenticity is
 - encryption
 - digital signature
 - authentication
 - SSL
- The encrypted hash created by the sender's private key is called
 - message
 - hash value
 - digital signature
 - ciphertext
- The sender encrypts the hash value using the
 - public key
 - shared key
 - session key
 - private key
- The recipient decrypts the digital signature using the
 - public key
 - private key
 - hash function
 - session key

2 Put (✓) or (x) in front of each of the following sentences:

- The hash value can be used to restore the original data. ()
- A hash function generates a unique value based on the input data. ()
- A digital signature is created by encrypting the hash value with the sender's private key. ()
- The recipient decrypts the digital signature using the sender's public key. ()
- A digital signature ensures that the received message has not been tampered with. ()
- The digital signature is used to hide the message content from the receiver. ()
- The hash function used by the recipient must be the same as the one used by the sender. ()
- Certification Authority (CA) verifies that a public key belongs to its claimed owner. ()
- A digital certificate includes only the public key without identifying information. ()
- SSL/TLS technology encrypts communication between a web browser and a web server. ()
- The URL of an SSL/TLS-secured page begins with "http://". ()
- The session key method is used in SSL/TLS encryption. ()
- TLS is an older, less secure version of SSL. ()
- The term SSL/TLS is often used because "SSL" became widely recognized. ()
- The digital signature process requires both hashing and encryption steps. ()
- Encrypting the hash value with the sender's private key creates a digital signature. ()
- The URL of an encrypted web page begins with https://. ()
- The organization that verifies the ownership of a public key is called a Certification Authority (CA). ()

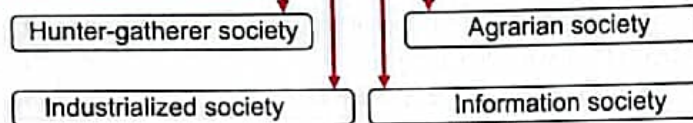
Development of Information Technology

1 Advancements in Information Technology and Future Society

نتقدم في تكنولوجيا المعلومات والمجتمع المستقبلي

1 Flow Societal Development

تدفق التطور المجتمعي



Name	Explanation	Impactful Technologies and Tools
1 Hunter-gatherer society	- From the birth of humanity. - A society where people live through hunting.	Stone axes, bows and arrows, fire-starting techniques, language, etc.
2 Agrarian society	- From around 13,000 BCE. - A society where people lead a stable life by growing and harvesting food.	Agricultural tools, irrigation, etc.
3 Industrialized society	- From the mid-18th century (post-industrial revolution) - A society where industrialization advanced through mass production using machinery, facilitated by the invention of the steam engine and electricity.	Steam engines, industrial machinery, printing technology, etc.
4 Information society	- From the latter half of the 20th century - A society where automation has been promoted by the advancement of computers.	Computers, the internet, etc.

- 1 مجتمع الصيادين الجامعين: منذ ولادة البشرية - مجتمع يعيش الناس فيه من خلال الصيد.
- 2 المجتمع الزراعي: منذ حوالي 13.000 قبل الميلاد - مجتمع يقود الناس فيه حياة مستقرة من خلال زراعة الغذاء وحصاده.
- 3 المجتمع الصناعي: منذ منتصف القرن الثامن عشر (بعد الثورة الصناعية) - مجتمع تقدمت فيه الصناعة من خلال الإنتاج الضخم باستخدام الآلات، بفضل اختراع المحرك البخاري والكهرباء.
- 4 مجتمع المعلومات: منذ النصف الثاني من القرن العشرين - مجتمع تم فيه تعزيز الأتمتة من خلال تقدم أجهزة الكمبيوتر.
- 5 التقنيات والأدوات المؤثرة: أجهزة الكمبيوتر، الإنترنت، إلخ.



2 Society 5.0

مجتمع الجيل الخامس

A new society where virtual space (cyberspace) and real space (physical space) are integrated to solve various social issues and achieve economic development.



مجتمع جديد يتم فيه دمج الفضاء الافتراضي (الفضاء الإلكتروني) والفضاء الحقيقي (الفضاء المادي) لحل مختلف القضايا الاجتماعية وتحقيق التنمية الاقتصادية

2 New Information Technologies Attracting Attention

تقنيات المعلومات الجديدة التي تجذب الانتباه



1 Big Data: البيانات الضخمة

Vast collections of data in various forms, with different characteristics and of various types.

مجموعات ضخمة من البيانات في أشكال مختلفة، بخصائص وأنواع متنوعة

Data consists of three elements: تتكون البيانات من ثلاثة عناصر

- data (volume) , • data (variety), • and data (generation/update frequency).

حجم البيانات، وتنوع البيانات، ووتيرة توليد/تحديث البيانات

2 AI (Artificial Intelligence): الذكاء الاصطناعي

A technology that uses computers to artificially mimic human intellectual behavior.

تقنية تستخدم أجهزة الكمبيوتر لتقليد السلوك الفكري البشري بشكل مصطنع



Examples: Autonomous driving, telemedicine, smart agriculture, smart homes, etc.

أمثلة: القيادة الذاتية، والتطبيب عن بعد، والزراعة الذكية، والمنازل الذكية، وما إلى ذلك

3 Machine Learning: التعلم الآلي

A technology where computers learn from large amounts of data to extract rules and patterns from the data.

تقنية تتعلم فيها أجهزة الكمبيوتر من كميات كبيرة من البيانات لاستخراج القواعد والأنماط من البيانات

4 Internet of Things (IoT): إنترنت الأشياء

Technology that supports daily life by connecting household appliances and other items to the internet, thereby allowing the appliances to communicate with each other.

تقنية تدعم الحياة اليومية من خلال ربط الأجهزة المنزلية وغيرها من العناصر بالإنترنت، مما يسمح للأجهزة بالتواصل مع بعضها البعض



5 Smart Home: المنزل الذكي

A residence that utilizes IoT and AI technologies to provide a more comfortable living environment.

مسكن يستخدم تقنيات إنترنت الأشياء والذكاء الاصطناعي لتوفير بيئة معيشية أكثر راحة

6 Virtual Reality (VR): الواقع الافتراضي

A technology that allows users to experience an illusion of reality in a simulated environment.

تقنية تسمح للمستخدمين بتجربة وهم الواقع في بيئة محاكاة



6 Augmented Reality (AR): الواقع المعزز

A technology that uses computer processing to enhance the real-world environment perceived by human senses (vision, etc.).

تقنية تستخدم معالجة الكمبيوتر لتعزيز البيئة الواقعية التي تدركها الحواس البشرية (الرؤية، إلخ)



3 Changes in Life Caused by Information Technology

التغيرات في الحياة التي تسببها تكنولوجيا المعلومات

1 Technostress: الإجهاد التكنولوجي

The overall term for mental and physical problems that arise from using computers.

المصطلح العام للمشاكل العقلية والجسدية التي تنشأ من استخدام أجهزة الكمبيوتر



• Technophobia: رهاب التكنولوجيا

A state of anxiety or fear towards using computers due to a sense of discomfort or lack of confidence in handling them.

حالة من القلق أو الخوف تجاه استخدام أجهزة الكمبيوتر بسبب الشعور بعدم الراحة أو عدم الثقة في التعامل معها



• Techno-Addiction: الإدمان التكنولوجي

Excessive dependency on computers. الاعتماد المفرط على أجهزة الكمبيوتر

• VDT Disorder: اضطراب

Shoulder stiffness and eye strain caused by prolonged computer use.

نصلب الكتف وإجهاد العين الناتج عن استخدام الكمبيوتر لفترات طويلة.



2 Digital Divide: الفجوة الرقمية

The gap between those who can utilize information technology and those who cannot.

الفجوة بين أولئك الذين يستطيعون الاستفادة من تكنولوجيا المعلومات وأولئك الذين لا يستطيعون ذلك.



Warm Up

تحدى معلوماتك

Answer the following questions:

- 1 Choose the one that is the most appropriate sequence of societal development from the options A to D below, and answer using the letter.

- A) Hunter-gatherer society → Agrarian society → Industrialized society → Information society
 B) Agrarian society → Hunter-gatherer society → Information society → Industrialized society.
 C) Agrarian society → Hunter-gatherer society → Industrialized society → Information society
 D) Hunter-gatherer society → Agrarian society → Information society → Industrialized society

- 2 Choose the most closely related option for the following sentences from the options 1) to 5) below, and answer using the letters.

- [1] Technology that connects all things (objects) to the internet.
 [2] A technology in which machines analyze data to extract rules and patterns from the data.
 [3] A vast amount of data that is difficult for humans to fully comprehend.
 [4] A virtual space which is created by a computer and allows for experiences that feel like reality.
 A) Machine Learning B) Big data C) IoT (Internet of Things)
 D) Virtual Reality E) Augmented Reality

- (3) What is the term for the gap between those who can utilize information technology, such as the internet, and those who cannot?



Explanation

الشرح

- 1 A
 2 [1] C [2] A [3] B [4] D
 3 Digital Divide



Al-Faez Exercises

- 1 Choose the correct answer from the following:

- 1- Society 5.0 integrates
 a. Factories and schools b. Cyberspace and real space
 c. People and animals d. Water and air
 2- Big Data is characterized by volume, variety, and
 a. Value b. Velocity c. Visibility d. Vision
 3- AI stands for
 a. Automatic Interface b. Artificial Intelligence
 c. Active Internet d. Applied Information
 4- Machine Learning extracts patterns from
 a. Small data b. Images c. Textbooks d. Big data
 5- IoT connects household appliances through
 a. Wi-Fi b. Bluetooth c. The internet d. Electricity
 6- Smart homes use both IoT and
 a. AI b. VR c. AR d. VDT
 7- Virtual Reality provides experiences in a
 a. Real space b. Classroom c. Simulated environment d. Database
 8- The gap between those who can and cannot use IT is called
 a. Technostress b. Cybercrime c. Digital divide d. Data gap

9- The hunter-gatherer society relied on tools such as

- a. Steam engines b. Stone axes c. Computers

10- The agrarian society began around

- a. 1300 CE b. 13,000 BCE c. 18th century

11- The main activity of the agrarian society was

- a. Hunting b. Manufacturing c. Trading

12- Industrialized society emerged after the

- a. Stone Age b. Agricultural revolution c. Industrial revolution d. Digital revolution

13- Steam engines and electricity led to

- a. Mass production b. Smart homes c. Cybersecurity d. Virtual reality

14- The information society began in the

- a. 17th century b. 18th century c. 19th century d. 20th century

15- Automation in the information society was promoted by

- a. Cars b. Computers c. Robots d. Satellites

2 Put (✓) or (x) in front of each of the following sentences:

- 1- The three main characteristics of Big Data are volume, variety, and velocity. ()
- 2- Artificial Intelligence allows computers to imitate human thinking and behavior. ()
- 3- Machine Learning does not require data to function. ()
- 4- IoT connects devices and appliances through the internet. ()
- 5- Smart homes are unrelated to IoT or AI technologies. ()
- 6- Virtual Reality provides users with experiences in simulated environments. ()
- 7- Augmented Reality replaces the real world completely with virtual scenes. ()
- 8- Technostress refers to physical and mental issues caused by computer use. ()
- 9- Techno-addiction means a total avoidance of computer use. ()
- 10- The hunter-gatherer society depended on hunting and gathering for survival. ()
- 11- The agrarian society started around 13,000 CE. ()
- 12- Farming and food production were the main features of the agrarian society. ()
- 13- The industrialized society developed before the invention of the steam engine. ()
- 14- The information society began in the 21st century. ()
- 15- Computers and the internet are the key technologies of the information society. ()
- 16- Society 5.0 combines cyberspace and physical space. ()
- 17- Society 5.0 aims to reduce economic development and slow social progress. ()
- 18- Big Data includes large and varied collections of information. ()
- 19- The digital divide represents inequality in access to and use of information technology. ()
- 20- Electricity and industrial machinery promoted mass production in the industrialized society. ()

d. Tractors

d. 20th century

d. Farming

d. Digital revolution

d. Virtual reality

d. 20th century

d. Satellites

3 Complete the following with the suitable words in brackets:

(13,000 BCE – digital divide – internet – computers – velocity)

- 1- IoT connects household appliances to the internet.
- 2- The agrarian society began around 13,000 BCE.
- 3- Automation in the information society was promoted by the advancement of computers.
- 4- Big Data is characterized by volume, variety, and velocity.
- 5- The gap between people who can and cannot use IT is known as the digital divide.

4 Write the scientific concept for each of the following:

- 1- A society where people live through hunting and use tools such as stone axes and bows.
- 2- A society where people grow and harvest food to lead a stable life.
- 3- A society that advanced through mass production using machinery powered by steam engines and electricity.
- 4- A society where automation is promoted by the development of computers and the internet.
- 5- A new type of society integrating cyberspace and real space to solve social issues and achieve economic growth.
- 6- Vast collections of varied data characterized by volume, variety, and velocity.
- 7- Technology that allows computers to mimic human intellectual behavior.
- 8- Technology that enables computers to learn from large amounts of data and extract patterns.
- 9- Technology that connects everyday devices and appliances through the internet.
- 10- The gap between people who can use information technology and those who cannot.

5 Complete the following with the suitable words:

- 1- The hunter-gatherer society relied on such as stone axes and bows.
- 2- Stable life in the was achieved through growing and harvesting food.
- 3- The industrialized society appeared the Industrial Revolution.
- 4- The main driving forces of industrialized society were steam engines and
- 5- The started in the latter half of the 20th century.
- 6- Artificial Intelligence enables computers to mimic intellectual behavior.
- 7- extracts rules and patterns from large amounts of data.
- 8- provide a comfortable living environment using IoT and AI technologies.
- 9- gives users an illusion of reality in a simulated environment.

1 Choose the correct answer from the following:

- Information has no
a. form b. color c. limit d. owner
- Media literacy is the ability to
a. read books b. interpret media c. play music d. design posters
- Information is used for
a. decoration b. games c. decision-making d. translation
- Data are represented using
a. numbers b. books c. colors d. signals
- Information holds
a. form b. time c. weight d. meaning

2 Put (✓) or (x) in front of each of the following sentences:

- Identity theft means pretending to be someone else to steal information. ()
- Leakage of personal information means keeping private data safe. ()
- Posting false rumors online helps maintain a safe digital environment. ()
- Respecting others' privacy and rights is part of information ethics. ()
- Responsible online behavior helps create a healthy information society. ()

3 Complete the following with the suitable words in brackets:

(Publicity Rights – human life – laws – Image Rights – Right to Privacy)

- Data may be shared without consent when necessary for the protection of or property.
- Sharing personal information is allowed when it is based on and regulations.
- The right to keep private information secret is called the
- Preventing others from using one's face or appearance without permission is part of ...
- The right protecting the economic interests of celebrities is called

4 Write the scientific concept for each of the following:

- Government office responsible for registering Industrial Property Rights in Egypt.
- A Creative Commons condition that forbids modifying or altering the original work.
- Rights that protect advanced technological ideas and inventions.
- Rights that protect the shape and structure of a product.
- A Creative Commons condition that requires users to give proper credit to the creator.

1 Choose the correct answer from the following:

- Media are tools for
a. eating b. traveling c. conveying information d. storing energy
- Persistence means information cannot be
a. copied b. erased c. printed d. read
- Secondary information comes from
a. research b. experiments c. third parties d. surveys
- Cross-checking means comparing information to ensure
a. beauty b. privacy c. speed d. accuracy
- Recording media are used for
a. talking b. recording c. painting d. speaking

2 Put (✓) or (x) in front of each of the following sentences:

- Using smartphones while walking can cause safety problems. ()
- Cybercrime refers to crimes committed using computers or networks. ()
- The application of information ethics depends on the existence of laws. ()
- Information on the internet spreads easily and rarely disappears completely. ()
- Once information is deleted from the internet, it completely vanishes forever. ()

3 Complete the following with the suitable words in brackets:

(compliance – Prior Approval System – law – Personal Information – Numbers)

- Companies must obtain a license from the Personal Data Protection Center to ensure with the law.
- The system where data is not collected unless prior consent is given is called the
- such as passport or national ID numbers are called Personal Identification Codes.
- Information like race, creed, or medical history is known as Special Care-Required
- The that regulates the handling of personal information is called the Act on the Protection of Personal Information.

4 Write the scientific concept for each of the following:

- Rights that protect designs such as shapes and patterns of products.
- A situation in which copyrighted material can be used without obtaining permission from the copyright holder.
- Rights related to product names, logos, text, and sound.
- Rights mainly related to the manufacturing of industrial or commercial products.
- A legal protection that ensures fair use and safeguards the rights of creators to promote cultural development.

1 Choose the correct answer from the following:

- Knowledge is information that has been
a. analyzed b. deleted c. printed d. moved
- Primary information is obtained through
a. reading b. guessing c. copying d. experience
- Reproducibility means information can be
a. deleted b. hidden c. copied d. limited
- Propagation means information can be easily
a. destroyed b. reduced c. hidden d. spread
- Information spreads through
a. games b. mass media c. machines d. schools

2 Put (✓) or (x) in front of each of the following sentences:

- Publishing someone's personal data without consent respects their privacy. ()
- Social media has no influence on communication between individuals. ()
- Excessive internet use that harms daily life is known as internet addiction. ()
- Using smartphones while walking can cause safety problems. ()
- Cybercrime refers to crimes committed using computers or networks. ()

3 Complete the following with the suitable words in brackets:

(human life – Image Rights – Four Basic Items – Law – Right to Privacy)

- Name, address, date of birth, and gender are called
- Providing data without consent is allowed when it is based on
- Data sharing is allowed to protect
- The right to keep personal information secret is called
- Preventing others from using one's photo without permission refers to

4 Write the scientific concept for each of the following:

- A Creative Commons condition that requires users to give proper credit to the creator.
- Rights granted to individuals or organizations that communicate or transmit copyrighted works.
- Principle under which rights are established at the moment a work is created, without formal registration.
- The act of using a portion of another person's copyrighted work within your own work under specific rules.
- The right of an author to receive economic benefit from their work for a specific period after their death.

Development of Communication Methods

Media and Its Evolution.

1 Communication and Its Development

الاتصال وتطوره

1 Communication Before Telecommunications

وسائل الاتصال قبل وجود الاتصالات السلكية ولا سلكية

- In ancient times, basic information was conveyed by lighting (signal fires) or beating drums.
في العصور القديمة، تم نقل المعلومات الأساسية بـ (إشعال نيران) الإشارة أو ضرب الطبول
- After the development of writing, messages were written on (paper) and delivered using messengers or carrier pigeons.
بعد تطوير الكتابة، كُتبت الرسائل على الورق وتم تسليمها باستخدام الرسل أو الحمام الزاجل
- The (modern postal system) was established in 1840.
تم إنشاء نظام البريد الحديث في عام 1840



2 The Beginning of Telecommunications

بداية الاتصالات السلكية واللاسلكية

- In 1837, an American named (Morse) invented the (Morse telegraph) (for the transmission and reception of codes via telecommunication).
في عام 1837، اخترع أمريكي يدعى (مورس) (تلفراف مورس) لإرسال واستقبال الرموز عبر الاتصالات السلكية واللاسلكية
- In 1876, an American named (Bell) invented the (telephone).
في عام 1876، اخترع أمريكي يدعى (بيل) (الهاتف)
- In 1895, an Italian named (Marconi) invented the (wireless telegraph).
في عام 1895، اخترع إيطالي يدعى (ماركوني) (التلفراف اللاسلكي)
- In 1946, mobile phone service (cellular phones) began to be used in the United States.
في عام 1946، بدأ استخدام خدمة الهاتف المحمول (الهواتف الخلوية) في الولايات المتحدة

2 Mass communication (Mass media)

الاتصال الجماهيري (وسائل الاتصال الجماهيري)

A means of sending information to a large number of people at once.

وسيلة لإرسال المعلومات إلى عدد كبير من الأشخاص في وقت واحد

Examples: Newspapers and magazines, radio and television broadcasts, etc.

أمثلة: الصحف والمجلات، البث الإذاعي والتلفزيوني، إلخ



3 The Development of Mass Communication

تطور الاتصال الجماهيري

- In the mid-15th century, a German named (Gutenberg) invented the (movable-type printing press).



- In 1906, the first experimental broadcast of (radio) was conducted in the United States. وفي عام 1906، تم إجراء أول بث تجريبي لـ (الراديو) في الولايات المتحدة
- In 1928, the first experimental broadcast of (television) was conducted in the United States. وفي عام 1928، تم إجراء أول بث تجريبي لـ (التلفزيون) في الولايات المتحدة

4 The Development of the Internet

تطور الإنترنت

- In 1969, with the support of the United States Department of Defense, an experiment was conducted on a computer network called (ARPANET).

في عام 1969، بدعم من وزارة الدفاع الأمريكية، تم إجراء تجربة على شبكة كمبيوتر تسمى (أربانت)

- Initially, it was mainly used by (research institutions).

في البداية، تم استخدامها بشكل رئيسي من قبل (مؤسسات البحث)

- However, it eventually became known as the (internet) and began to spread among the general public.

ومع ذلك، أصبحت في النهاية معروفة باسم (الإنترنت) وبدأت في الانتشار بين عامة الناس



Warm Up

تحدى معلوماتك

Answer the following questions:

- Choose the terms that best fit into the blanks [1] to [4] from the options A to D.
 - In the mid-15th century, Gutenberg invented the ([1]).
 - In 1837, Morse invented the ([2]).
 - In 1876, Bell invented the ([3]).
 - In 1895, Marconi invented the ([4]).
- A) Wireless telegraph B) Morse telegraph C) Movable-type printing press D) Telephone

Explanation

الشرح

- [1] C [2] B [3] D [4] A

Al-Faez Exercises

1 Choose the correct answer from the following:

- The Morse telegraph was invented by
a. Bell b. Marconi c. Morse d. Gutenberg
- The telephone was invented in
a. 1876 b. 1837 c. 1895 d. 1946
- The inventor of the telephone was
a. Bell b. Morse c. Marconi d. Edison
- The wireless telegraph was invented by
a. Morse b. Marconi c. Bell d. Gutenberg
- Mobile phone service began in the United States in
a. 1837 b. 1895 c. 1969 d. 1946
- Mass communication means sending information to
a. One person b. A small group c. A large number of people d. Machines
- Examples of mass communication include
a. Letters b. Radio and television c. Telephone d. Morse code
- The movable-type printing press was invented by
a. Bell b. Gutenberg c. Morse d. Marconi
- The first experimental radio broadcast was conducted in
a. 1906 b. 1928 c. 1837 d. 1876
- The first computer network experiment supported by the U.S. Department of Defense was called
a. Internet b. ARPANET c. Wi-Fi d. Telegraph
- Basic information in ancient times was conveyed by
a. Writing b. Radio c. Electricity d. Signal fires
- Drums were used in ancient times for
a. Music b. Celebration c. Communication d. Transportation
- After writing was developed, messages were written on
a. Metal b. Stone c. Paper d. Wood
- Written messages in early times were delivered by
a. Messengers b. Printers c. Phones d. Radios
- The modern postal system was established in
a. 1740 b. 1840 c. 1940 d. 2000

2 Put (✓) or (x) in front of each of the following sentences:

- Morse invented the Morse telegraph for sending and receiving codes. ()
- Bell invented the telephone in 1876. ()
- Marconi invented the wireless telegraph in 1895. ()

- 4- Mobile phone service began in the United States in 1946. ()
- 5- The movable-type printing press was invented by Marconi. ()
- 6- Gutenberg invented the movable-type printing press in the mid-15th century. ()
- 7- The first experimental radio broadcast took place in the United States in 1906. ()
- 8- The first experimental television broadcast occurred in 1928. ()
- 9- Mass communication means sending information to a few individuals only. ()
- 10- Newspapers and magazines are examples of mass communication. ()
- 11- The internet was originally created for entertainment purposes. ()
- 12- The development of communication methods shows human progress in sharing information. ()
- 13- In ancient times, people used signal fires and drums to convey information. ()
- 14- Writing was used for communication before signal fires. ()
- 15- After the invention of writing, messages were delivered by messengers or carrier pigeons. ()
- 16- The modern postal system was established in 1840. ()
- 17- The Morse telegraph was invented in 1876. ()

3 Complete the following with the suitable words in brackets:

(drums – signal fires – carrier pigeons – 1840 – paper)

- 1- Basic information in ancient times was conveyed by lighting
- 2- People in ancient times used to send basic messages.
- 3- After the development of writing, messages were written on
- 4- Messages in early societies were delivered using messengers or
- 5- The modern postal system was established in the year

4 Write the scientific concept for each of the following:

- 1- The first experimental broadcast conducted in 1906 in the United States.
- 2- The service that began in 1946 in the United States allowing communication through mobile devices.
- 3- The experimental broadcast conducted in 1928 in the United States using visual transmission.
- 4- The system that was established in 1840 for sending and receiving written messages.
- 5- The invention created by Morse in 1837 for sending coded messages through telecommunication.
- 6- The device invented by Bell in 1876 that allows voice communication over long distances.
- 7- The invention developed by Marconi in 1895 for sending messages without wires.
- 8- The computer network developed in 1969 with U.S. Department of Defense support that later became the internet.



Communication and Its Forms

1 Communication and Its Development

الاتصال وتطوره

1 Communication الاتصال

The process of receiving and exchanging information between people.

عملية استقبال وتبادل المعلومات بين الناس

2 Classification of Communication تصنيف الاتصال

1 Classification by the Number of Senders and Receivers

التصنيف حسب عدد المرسلين والمستلمين



- **One-to-one (Individual type):** One sender to one receiver.

واحد لواحد (النوع الفردي): مرسل واحد إلى مستلم واحد

Examples: Letters, Telephones, etc.

أمثلة: الرسائل، الهواتف، إلخ

- **One-to-many (Mass media type):** One sender to multiple recipients.

واحد إلى العديد (نوع وسائل الاتصال الجماهيرية): مرسل واحد إلى مستلمين متعددين

Examples: Newspapers, Radio, Television, Web pages, etc.

أمثلة: الصحف، الراديو، التلفزيون، صفحات الويب، إلخ

- **Many-to-one (Reverse mass media type):** Multiple senders to one recipient.

متعدد إلى واحد: (نوع وسائل الاتصال العكسية) مرسلون متعددون إلى مستلم واحد

Examples: Survey tabulation, Inquiries, etc.

أمثلة: جدولة الاستبيانات الاستفسارات، إلخ

- **Many-to-many (Conference type):** Multiple senders to multiple receivers.

متعدد إلى متعدد (نوع مؤتمرات): مرسلون متعددون إلى مستلمين متعددين

Examples: Video conferencing, Group calls, Social media, etc.

أمثلة: مؤتمرات الفيديو المكالمات الجماعية، وسائل التواصل الاجتماعي، إلخ

2 Classification based on the location relationship between sender and receiver

التصنيف بناءً على علاقة الموقع بين المرسل والمستلم



- **Direct communication:** The sender and the receiver are directly face-to-face.

الاتصال المباشر: المرسل والمستلم وجهاً لوجه مباشرة

This method enables communication while observing the other person's reactions, but there are time and location constraints.

يمكن هذه الطريقة من مراقبة ردود فعل الشخص الآخر أثناء الاتصال ، ولكن هناك قيود على الوقت والموقع

Examples: Conversations, Presentations, etc. أمثلة: المحادثات، العروض التقديمية، إلخ.

- **Indirect communication:** The sender and the receiver are separated.
اتصال غير مباشر: المرسل والمستلم منفصلان

While it is not possible to directly see the other person's reactions, it can remove time and location constraints.

بما ليس من الممكن رؤية ردود فعل الشخص الآخر مباشرة، فإنه يمكن إزالة قيود الوقت والموقع

Examples: Telephones, Email, Web pages, etc. أمثلة: الهواتف البريد الإلكتروني، صفحات الويب، إلخ.

Classification by Synchronization of Communication

Synchronous

Asynchronous

- **Synchronous:** The sender and receiver share information almost simultaneously.
متزامن: يشارك المرسل والمستلم المعلومات في وقت واحد تقريبًا

Examples: Conversation, Telephones, Presentations, Video calls, Live television broadcasts, etc.

- **Asynchronous:** Information is sent and received times convenient for both the sender and the receiver.

غير متزامن: يتم إرسال المعلومات واستقبالها في أوقات مناسبة لكل من المرسل والمستلم

Examples: Letters, Email, Electronic bulletin boards, Messaging apps, Social media, etc.

Warm Up

تحدى معلوماتك

- Choose the terms that best fit into the blanks [1] to [4] from the options A to D.
 - In the mid-15th century, Gutenberg invented the ([1]).
 - In 1837, Morse invented the ([2]).
 - In 1876, Bell invented the ([3]).
 - In 1895, Marconi invented the ([4]).
- A) Wireless telegraph B) Morse telegraph C) Movable-type printing press D) Telephone

Explanation

الشرح

- [1] C [2] B [3] D [4] A



Al-Faez Exercises

1 Choose the correct answer from the following:

- The process of receiving and exchanging information between people is called.....
a. Interaction b. Communication
c. Transmission d. Expression
- The type of communication where one sender communicates with one receiver
a. One-to-one b. One-to-many
c. Many-to-one d. Many-to-many
- Letters and telephones are examples of this communication type
a. Individual b. Conference
c. Reverse mass media d. Mass media
- The type where one sender communicates with multiple recipients.
a. One-to-one b. One-to-many c. Many-to-one d. Many-to-many
- Newspapers and TV belong to this communication type.
a. Mass media b. Reverse mass media c. Direct d. Synchronous
- The communication type where multiple senders send to one recipient.
a. Individual b. Reverse mass media c. Conference d. Indirect
- Surveys and inquiries are examples of this communication type.
a. One-to-one b. One-to-many c. Many-to-one d. Many-to-many
- The communication type where multiple senders and receivers interact together.
a. Many-to-many b. One-to-one c. Direct d. Synchronous
- Video conferencing and social media are examples of this communication type.
a. Reverse mass media b. Synchronous
c. Individual d. Many-to-many
- The type where sender and receiver are face-to-face.
a. Direct b. Indirect c. Asynchronous d. Mass media
- The type that allows observing reactions but has time and place limits.
a. Direct b. Indirect c. Synchronous d. Many-to-one
- The type where sender and receiver are separated in location.
a. Direct b. Indirect c. Synchronous d. Asynchronous
- The communication type that removes time and location constraints.
a. Direct b. Indirect c. Synchronous d. Mass media
- The communication type where sender and receiver share information almost simultaneously.
a. Synchronous b. Asynchronous c. Indirect d. Reverse
- Letters and emails belong to this category of communication.
a. Synchronous b. Asynchronous c. Direct d. Many-to-one

2 Put (✓) or (x) in front of each of the following sentences:

- 1- Communication is the process of receiving and exchanging information between people. ()
- 2- One-to-one communication means one sender to multiple receivers. ()
- 3- Letters and telephones are examples of one-to-one communication. ()
- 4- One-to-many communication involves one sender and many receivers. ()
- 5- Newspapers and radio are examples of one-to-many communication. ()
- 6- Many-to-one communication means many senders send information to one receiver. ()
- 7- Surveys and inquiries are examples of many-to-one communication. ()
- 8- Many-to-many communication connects multiple senders and multiple receivers. ()
- 9- Social media and group calls are examples of one-to-one communication. ()
- 10- Direct communication occurs when the sender and receiver are face-to-face. ()
- 11- Direct communication removes time and location constraints. ()
- 12- Indirect communication allows people to communicate even when separated by distance. ()
- 13- Telephones and emails are examples of indirect communication. ()
- 14- Synchronous communication happens when sender and receiver share information at the same time. ()
- 15- Asynchronous communication means both parties must be present at the same moment. ()
- 16- Letters and emails are considered asynchronous communication. ()
- 17- Live television broadcasts are examples of synchronous communication. ()
- 18- Conversations and presentations are examples of indirect communication. ()
- 19- Indirect communication does not allow seeing the other person's reactions directly. ()
- 20- Social media can be used for both synchronous and asynchronous communication. ()

3 Complete the following with the suitable words in brackets:

(one-to-one - mass media communication - communication - examples - multiple receivers)

- 1- The process of receiving and exchanging information between people is called
- 2- In communication, information flows from one sender to one receiver.
- 3- Letters and telephones are of individual communication.
- 4- One-to-many communication involves one sender and
- 5- Newspapers, radio, and television are examples of

4 Write the scientific concept for each of the following:

- 1- The process of receiving and exchanging information between people.
- 2- The type of communication where one sender interacts with one receiver.
- 3- The type of communication where one sender communicates with many receivers.
- 4- The communication form in which many senders send information to one receiver.
- 5- The communication type in which the sender and receiver are directly face-to-face.

Lesson (3) الإنترنت والاتصالات

Internet and Communication



1 Internet Communication الاتصال عبر الإنترنت

1 Email (Electronic mail) البريد الإلكتروني

A tool for sending and receiving text-based messages over the internet.

أداة لإرسال واستقبال الرسائل القائمة على النص عبر الإنترنت

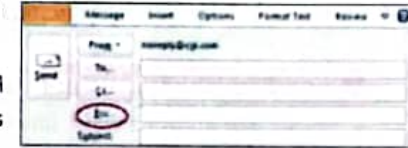
Email has the feature of (broadcast capability) that allows the user to send messages to multiple recipients.

يتميز البريد الإلكتروني بـ (قدرة البث) التي تسمح للمستخدم بإرسال الرسائل إلى مستلمين متعددين

[1] (To) إلى

Input the email address(es) of the recipient(s) to whom you want to send the email.

أدخل عنوان (عناوين) البريد الإلكتروني للمستلم (المستلمين) الذي تريد إرسال البريد الإلكتروني إليه



[2] (CC) نسخة

Input the email address(es) of the recipient(s) with whom you want to share the email content.

أدخل عنوان البريد الإلكتروني للمستلم (المستلمين) الذي تريد مشاركة محتوى البريد الإلكتروني معهم

[3] (BCC) نسخة مخفية

Input the email address(es) of the recipient(s) with whom you want to share the email content but do not want the other recipient(s) to see.

أدخل عنوان البريد الإلكتروني للمستلم (المستلمين) الذي تريد مشاركة محتوى البريد الإلكتروني معهم ولكن لا تريد أن يرى المستلمون الآخرون ذلك

Other recipients cannot see the email addresses or the fact that BCC is being used.

لا يمكن للمستلمين الآخرين رؤية عناوين البريد الإلكتروني ونستخدم BCC لهذا الغرض

2 Bulletin board system (BBS) نظام لوحة الإعلانات

A tool that allows the user to post messages and write replies to other messages.

أداة تسمح للمستخدم بنشر الرسائل وكتابة الردود على الرسائل الأخرى

3 Messaging app تطبيق المراسلة

Tools that enable the exchange of text, images, and videos.

أدوات تمكن تبادل النصوص والصور ومقاطع الفيديو

This enables easy communication for individuals or groups.

هذا يسهل الاتصال للأفراد أو المجموعات



Examples: SMS (Short Message Service), LINE, etc.

أمثلة: خدمة الرسائل القصيرة (SMS، LINE)، إلخ

4 Video call مكالمة الفيديو

A tool that allows real-time conversation while viewing the other person's video via the internet.

أداة تسمح بالمحادثة في الوقت الفعلي أثناء مشاهدة فيديو الشخص الآخر عبر الإنترنت



5 Blog مدونه

A word coined by combining "web" and "log." A web service that allows you to compile and publish writings such as your diary on the internet.

كلمة تم صياغتها بدمج "web" و "log"، وهي خدمة ويب تسمح لك بتجميع ونشر كتابات مثل يومياتك على الإنترنت



6 Social media وسائل التواصل الاجتماعي

Services providing platforms where individuals can connect with each other on the internet.



7 Video sharing platform منصة مشاركة الفيديو

A service that allows a wide, unspecified audience to share and watch videos posted by other unspecified users on the internet.

خدمة تسمح لجمهور واسع غير محدد بمشاركة ومشاهدة مقاطع الفيديو المنشورة بواسطة مستخدمين غير محددين آخرين على الإنترنت



2 Characteristics of Communication on the Internet خصائص التواصل عبر الإنترنت

Anonymity

Immediacy

Convenience

Recordability

1 Anonymity إخفاء الهوية

Allows a user to hide information that could lead to personal identification (name, affiliation, etc.).

يسمح للمستخدم بإخفاء المعلومات التي قد تؤدي إلى تحديد الهوية الشخصية (الاسم والانتماء وما إلى ذلك).

Advantages: Users can express themselves freely, regardless of age or social status

مزايا: يمكن للمستخدمين التعبير عن أنفسهم بحرية، بغض النظر عن العمر أو الوضع الاجتماعي

Disadvantages: العيوب

1 Flaming A situation where critical comments focus on posts on social media and other platforms.

إساءة عبر الإنترنت: حيث تتركز التعليقات النقدية على المنشورات على وسائل التواصل الاجتماعي والمنصات الأخرى

2 Fake news False information that is distributed and spread on social media.

الأخبار المزيفة: معلومات كاذبة يتم توزيعها ونشرها على وسائل التواصل الاجتماعي



2 Immediacy الفورية

Allows a user to receive an immediate response from the other party.

يسمح للمستخدم بتلقي استجابة فورية من الطرف الآخر

3 Convenience الملائمة

Allows a user to communicate smoothly.

يسمح للمستخدم بالتواصل بسلاسة

4 Recordability القابلية للتسجيل

Sending and receiving information on the internet leaves a record (log).

إرسال واستقبال المعلومات على شبكة الإنترنت يترك سجلاً (سجل)

Warm Up

تحدى معلوماتك

1 For each of the following, choose the most appropriate explanation regarding methods of communication on the internet from the options A to D, and answer using the letters.

[1] Bulletin board system [2] Social media [3] Video sharing platform

A) A tool that allows real-time conversation while viewing the other person's video via the internet.

B) Services providing platforms where individuals can connect with each other on the internet.

C) A tool that allows the user to post messages and write replies to other messages.

D) A service that allows a wide, unspecified audience to share and watch videos posted by other unspecified users on the internet.

2 The following A to C are explanations of services that use the internet. Mark "✓" if the statement is correct, and "x" if it is incorrect.

A) Since online posts can be anonymous, it is fine for users to write whatever information they like.

B) When uploading videos to a video sharing platform, there is a possibility that individuals can be identified from buildings or signs visible in the video.

C) In internet communication, since records of interactions are kept, it is important to be considerate and ensure that your messages do not make the recipient feel uncomfortable.

Explanation الشرح

1 (1) [1] C [2] B [3] D

2 A) When posting on the internet, it is important to always consider the other person's perspective and show empathy, and to strive to share accurate information. This is because there is a possibility that your words may be misunderstood in a way that you did not intend. Therefore, x

B) ✓ C) ✓

Al-Faez Exercises

① Choose the correct answer from the following:

- 1- The main purpose of Internet communication tools is to
 - a. play games
 - b. share information
 - c. exchange information
 - d. both b and c
- 2- Email allows users to send messages to several recipients using
 - a. Attachments
 - b. Spam filters
 - c. Firewalls
 - d. Broadcast capability
- 3- The abbreviations "To", "CC", and "BCC" are commonly used in
 - a. Blogs
 - b. Video calls
 - c. Social media
 - d. Email communication
- 4- The term "BBS" stands for
 - a. Basic Blogging System
 - b. Bulletin Board System
 - c. Browser-Based Service
 - d. Binary Broadcasting Software
- 5- The main function of a BBS is to allow users to
 - a. make voice calls
 - b. design websites
 - c. post and read messages
 - d. edit videos
- 6- Messaging apps enable users to exchange in real time.
 - a. only text messages
 - b. text, images, and videos
 - c. emails only
 - d. software files
- 7- Video calls are important because they allow
 - a. anonymous chatting
 - b. visual and voice communication
 - c. offline messaging
 - d. audio editing
- 8- Blogs are mainly used by people to
 - a. play online games
 - b. send short messages
 - c. make phone calls
 - d. share opinions and experiences
- 9- Social media platforms allow users to interact by
 - a. only reading news
 - b. sharing and commenting on content
 - c. sending only emails
 - d. writing programs
- 10- The main goal of video sharing platforms is to
 - a. upload and watch videos
 - b. send secret messages
 - c. record phone calls
 - d. make spreadsheets
- 11- A person who hides their identity online benefits from
 - a. anonymity
 - b. convenience
 - c. immediacy
 - d. recordability

- 12- One negative effect of anonymity is the spread of
 - a. quick messages
 - b. fake news
 - c. privacy protection
 - d. recorded data
- 13- Immediacy means that communication on the Internet is
 - a. delayed
 - b. slow
 - c. instant and quick
 - d. difficult
- 14- Convenience in Internet communication means users can communicate
 - a. anytime
 - b. anywhere
 - c. devices must be wired
 - d. both a and b
- 15- Recordability allows users to
 - a. delete all records
 - b. review past communications
 - c. keep past communications
 - d. both b and c

② Put (✓) or (x) in front of each of the following sentences:

- 1- Email is a tool used for sending and receiving text-based messages over the Internet. ()
- 2- The broadcast capability in emails allows sending a message to only one recipient. ()
- 3- The "To" field in an email is used to enter the addresses of main recipients. ()
- 4- The "CC" field is used to send a copy of the email to additional recipients. ()
- 5- Recipients listed under "BCC" can be seen by all other recipients. ()
- 6- A Bulletin Board System (BBS) allows users to post and reply to messages. ()
- 7- Messaging apps can be used only for sending text without images or videos. ()
- 8- Video calls allow users to see and talk to each other in real time over the Internet. ()
- 9- A blog is an online tool for publishing diary-like writings. ()
- 10- Social media platforms are used only for watching videos, not for interaction. ()
- 11- A video sharing platform allows users to share and watch videos on the Internet. ()
- 12- Anonymity allows users to freely express opinions without revealing personal information. ()
- 13- Flaming refers to polite and friendly comments on social media posts. ()
- 14- Fake news is false information spread through social media. ()
- 15- Immediacy means getting instant responses during online communication. ()
- 16- Convenience refers to the difficulty of using internet tools for communication. ()
- 17- Recordability means that internet communication leaves no trace or record. ()
- 18- The log of online communication can be used to review past messages. ()
- 19- All online users are required to show their real names and identities. ()
- 20- Internet communication combines speed, convenience, and recordability. ()

5 Complete the following with the suitable words in brackets:

(Video call – connect – log – share – Images)

- 1- Messaging apps enable the exchange of text,, and videos.
- 2- A video sharing platform allows users to and watch videos.
- 3- ... is a tool that allows real-time conversation while viewing the other person's video.
- 4- A blog combines the words "web" and ".....".
- 5- Social media provides platforms where individuals can with each other.

6 Write the scientific concept for each of the following:

- 1- A tool for sending and receiving text-based messages over the internet.
- 2- A feature of email that allows sending messages to multiple recipients.
- 3- A field in an email used to input the address of the recipient. To
- 4- A tool that allows users to post messages and write replies to others.
- 5- Tools that enable the exchange of text, images, and videos for easy communication.
- 6- A tool that allows real-time conversation while viewing the other person's video.
- 7- A web service that allows you to compile and publish diary-like writings on the internet.
- 8- Services providing platforms where individuals can connect with each other on the internet.
- 9- A situation where critical comments focus on posts on social media.
- 10- False information that is distributed and spread on social media.

6 Complete the following with the suitable words:

- 1- Email is a tool for sending and receiving over the internet.
- 2- The feature that allows sending messages to multiple recipients is called
- 3- The "To" field is used to input the of the recipient.
- 4- The "CC" field is used to share the email content with
- 5- The "BCC" field hides the from other recipients.
- 6- A Bulletin Board System (BBS) allows users to post messages and to others.
- 7- allows users to hide information that could reveal personal identification.
- 8- refers to critical comments that focus on posts on social media.
- 9- Immediacy allows a user to receive an from the other party.



Analog and Digital

1 Analog and Digital التناظري والرقمي

1 Analog التناظري

Refers to quantities that can be measured continuously and with fine precision, such as mass, time, or temperature.

هي كميات تتغير تدريجياً وبشكل مستمر ويمكن قياسها بدقة فائقة، مثل الكتلة أو الوقت أو درجة الحرارة

Data represented in analog form is referred to as (analog data).

البيانات الممثلة في شكل تناظري يشار إليها باسم البيانات التناظرية

2 Digital الرقمي

Refers to quantities that continuously change and are represented numerically by segmenting at regular intervals.

تشير إلى الكميات التي تتغير باستمرار في خطوات محددة ومنفصلة ويتم تمثيلها رقمياً

Data represented in digital form is referred to as (digital data).

البيانات الممثلة في شكل رقمي يشار إليها باسم (البيانات الرقمية)

3 A/D conversion (digitization) التحويل من تناظري إلى رقمي

The process of converting analog data into digital data.

عملية تحويل البيانات التناظرية إلى بيانات رقمية

4 D/A conversion التحويل من رقمي إلى تناظري

Converting digital data into analog data. تحويل البيانات الرقمية إلى بيانات تناظرية

5 Advantages of Digital Data مزايا البيانات الرقمية

1 Data can be (accumulated) or (duplicated) without degradation.

يمكن تجميع البيانات أو استنساخها دون إهدار

2 It is easy to (modify) and (edit) the data. من السهل تعديل وتحرير البيانات

3 It is possible to efficiently (communicate) the information. من الممكن نقل البيانات بكفاءة

4 It is possible to (combine) various types of media.

من الممكن دمج أنواع مختلفة من الوسائط للتعبير عنها

6 Binary النظام الثنائي

A method of representing numbers using two types of digits, 0 and 1.

طريقة رقمية لتمثيل الأرقام باستخدام رقمين 0 و 1 وهما يمثلان نظام العد الثنائي

- In computers, all types of information, such as numbers, characters, audio, and images, are represented in (binary).

128	64	32	16	8	4	2	1
0	1	0	1	1	1	0	1

في أجهزة الكمبيوتر، جميع أنواع البيانات مثل الأرقام والأحرف والصوت والصورة يتم تمثيلها في النظام الثنائي

Warm Up

أجدي معلوماتك

Answer the following questions:

- For each of the following statements A to D, answer whether the statement describes analog or digital.
- A thermometer that represents a continuous quantity using the length of a mercury column.
 - Accurate and highly reproducible, without any degradation due to duplication or transmission.
 - A quantity that changes continuously can be represented using the numbers 0 and 1.
 - All information (numbers, text, audio, images, videos, etc.) can be represented in binary.

Explanation

الشرح

- A: Analog B: Digital C: Digital D: Digital



Al-Faez Exercises

- Choose the correct answer from the following:

- Data represented in analog form is referred to as
a. numeric data b. analog data c. binary data d. symbolic data
- Quantities that can be measured continuously and with fine precision are called
a. binary b. digital c. analog d. symbolic
- Quantities that change continuously and are represented numerically by segmenting at regular intervals are called
a. symbolic b. binary c. analog d. digital
- The process of converting analog data into digital data is called
a. D/A conversion b. digitization c. binary coding d. editing
- The process of converting digital data into analog data is called
a. A/D conversion b. analog process c. D/A conversion d. accumulation
- One advantage of digital data is that it can be without degradation.
a. erased b. accumulated c. hidden d. destroyed
- Digital data can be and easily.
a. viewed, shared b. modified, edited c. stored, erased d. copied, hidden

- Digital data makes it possible to efficiently information.
a. store b. erase c. communicate d. hide
- The method of representing numbers using two digits, 0 and 1, is called
a. symbolic b. analog c. digital d. binary
- In, all types of information are represented in binary form.
a. analog b. symbolic c. computers d. physical

- Put (✓) or (x) in front of each of the following sentences:

- Analog refers to quantities that can be measured continuously and with fine precision. ()
- Digital refers to quantities that can be measured continuously without segmentation. ()
- Data represented in analog form is known as analog data. ()
- Digital data represents information numerically by segmenting values at regular intervals. ()
- A/D conversion is the process of converting digital data into analog data. ()
- D/A conversion means converting digital data into analog data. ()
- Analog data can be easily modified and edited without degradation. ()
- Digital data can be accumulated or duplicated without losing quality. ()
- Communication of information is more efficient when using digital data. ()
- It is difficult to combine various types of media in digital form. ()
- Binary represents numbers using only two digits: 0 and 1. ()
- In computers, only numerical information is represented in binary form. ()
- Audio and images can be represented in binary form in computers. ()
- Digital data cannot be edited once stored. ()
- Analog quantities include measurements such as mass, time, and temperature. ()

- Complete the following with the suitable words in brackets:

(Degradation – Binary – Analog – Digital data – A/D conversion)

- Quantities that can be measured continuously and with fine precision are called
- Data represented in digital form is referred to as
- The process of converting analog data into digital data is known as
- The method of representing numbers using two digits, 0 and 1, is called
- Digital data can be accumulated or duplicated without

- Write the scientific concept for each of the following:

- The process of converting analog data into digital data.
- The process of converting digital data into analog data.
- Data represented using continuous quantities such as mass, time, or temperature.
- Data represented numerically by segmenting values at regular intervals.
- The method of representing numbers using two digits, 0 and 1.

Binary and Amount of Information



1 Bits and Bytes

1 (Bit) بت

The smallest unit of information, having only two possible states: "0" and "1".

صفر وحدة للمعلومات لها حالتان فقط "0" و "1"

One bit is capable of representing two states;

يمكن لـ (بت واحد) فقط تمثيل حالتين

for example, "a switch is on or off,"

على سبيل المثال: المفتاح إما (مفتوح أو مغلق)

"voltage is high or low,"

الجهد إما (مرتفع أو منخفض)

"or the orientation of a magnet is north or south."

اتجاه المغناطيس إما (شمال أو جنوب)

Actual information is represented by the arrangement of bits.

يتم تمثيل البيانات الفعلية بترتيب الـ bits

In general, bits can represent (2^2) different pieces of information.

شكل عام، يمكن لـ bit تمثيل "2" مختلفين من البيانات المعلومات.

Example:

1 bit: 2 possibilities: 0 or 1 ←----- احتمالان

2 bits: 4 possibilities: 00, 01, 10, 11 ←----- $2^2 = 4$ احتمالات

3 bits: 8 possibilities: 000, 001, 010, 011, 100, 101, 110, 111 ←----- 8 احتمالات

2 (Byte) بايت

A unit consisting of (8 bits). The notation is (B).

Byte: وحدة تتكون من (8 bit). يرمز إليها بالرمز (B).

1 B = (8 bits), which can represent (256) possibilities. ←----- 256 احتمال

3 Unit of information وحدة البيانات

The basic unit is 1 B. The unit changes every $2^{10} = (1,024)$ times.

وحدة البيانات: الوحدة الأساسية هي 1B. تتغير الوحدة كل (1.024) مرة

1 (KB) = 1,024 B

واحد كيلوبايت = 1024 بايت

2 1 (MB) = 1,024 KB

واحد ميجابايت = 1024 كيلوبايت

3 1 (GB) = 1,024 MB

واحد جيجابايت = 1024 ميجابايت

4 1 (TB) = 1,024 GB

واحد تيرابايت = 1024 جيجابايت

2 Decimal and Binary

نظام العد العشري ونظام العد الثنائي

1 (Decimal) نظام العد العشري

A method of representing numbers using ten digits from "0" to "9".

طريقة لتمثيل الأعداد باستخدام عشرة أرقام من "0" إلى "9"

A number expressed in decimal notation is denoted as (decimal).

الرقم المعبر عنه في النظام العشري يرمز إليه بـ (Decimal)

2 (Binary) نظام الثنائي

A method of representing numbers using two types of digits, "0" and "1".

طريقة لتمثيل الأعداد باستخدام نوعين من الأرقام، "0" و "1"

A number represented in binary is sometimes written with a subscript (2) placed at the bottom right of the number, such as (binary number).

ويكتب أحياناً الرقم المعبر عنه بالثنائي مع وضع رمز (2) منخفض في أسفل يمين الرقم، لبيان أنه ثنائي

3 (Conversion between Decimal and Binary) التحويل بين النظام العشري والنظام الثنائي

1 Conversion from binary to decimal. التحويل من النظام الثنائي إلى النظام العشري

Starting from the rightmost digit, multiply each digit by 1, 2^1 , 2^2 , 2^3 , ... in order, and then sum the results.

بدءاً من الرقم الموجود في أقصى اليمين، اضرب كل رقم في 1، 2^1 ، 2^2 ، 2^3 ، ... بالترتيب، ثم اجمع النتائج

Example: Convert the binary number $1011_{(2)}$ into decimal form.

مثال: تحويل الرقم الثنائي $1011_{(2)}$ إلى شكل عشري

$$1011_{(2)} = (1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0) = 11$$

2 Conversion from decimal to binary. التحويل من النظام العشري إلى النظام الثنائي

Take a decimal number and keep dividing it by 2 until the quotient becomes 1, then arrange the resulting quotients and remainders in reverse order from the left.

خذ العدد العشري واستمر في قسمته على 2 حتى يصبح الناتج 1، ثم رتب النواتج والبقايا الناتجة بترتيب عكسي من اليسار

Example: Represent the number "6" in decimal as a number in binary.

مثال: حول الرقم 6 من النظام العشري إلى النظام الثنائي

$$\begin{array}{r} 2)6 \\ 2)3 \dots 0 \\ 1 \dots 1 \end{array} \quad \text{Therefore, } 6 = (110_{(2)})$$

Warm Up

تجدیدی معلوماتك

Answer the following questions:

- 1 [1] Complete the following sentences by filling in the blanks A to E with the appropriate terms and numbers.

The smallest unit of information is called a bit, which corresponds to (A) digit in binary notation. This makes it possible to represent (B) different types of information. Additionally, a group of (C) bits is called one (D), and is represented as 1 B. For example, 24 bits is (E) B.

- [2] How many bits of information are required to represent all possible outcomes when throwing a set of dice (one large and one small)?
- [3] How many B is 1 MB? Answer in the form of a power of 2.
- [4] How many times greater is 4 bits of information compared to 2 bits of information?

-  [1] Express the following binary numbers in decimal form.

(A) $11010_{(2)}$ (B) $101011_{(2)}$

- [2] Express the following decimal number in binary.

(A) 39 (B) 120



Explanation

الشرح

- ❶ [1] A: A single digit in binary can represent two different values. 1 B: 2 C: 8

D: Byte E: Since 8 bits 1 B, 24 bits +8=3 B

[2] When you roll two dice (one large and one small), there are $6 \times 6 = 36$ possible combinations of outcomes.

With 5 bits, you can represent $2^5 = 32$ combinations.

and with 6 bits, you can represent $2^6 = 64$ combinations.

so the needed information is 6 bits

[3] 1 = MB 1,024 KB, and 1 KB = 1,024 B.

therefore, $1 \text{ MB} = 1,024 \text{ KB} = 1,024 \times 1,024 \text{ B} = 2^{10} \times 2^{10} \text{ B} = 2^{20} \text{ B}$

[4] The amount of information that can be represented with 2 bits is $2^2 = 4$ possibilities, and the amount of information that can be represented with 4 bits is $2^4 = 16$ possibilities. Therefore, $16 \div 4 = 4$ times

- 2 [1] (A) $11010_{(2)} = 0 \times 1 + 1 \times 2 + 0 \times 2^2 + 1 \times 2^3 + 1 \times 2^4$

$$= 0 + 2 + 0 + 8 + 16 = 26$$

$$(B) 101011_{(2)} = 1 \times 1 + 1 \times 2 + 0 \times 2^2 + 1 \times 2^3 + 0 \times 2^4 + 1 \times 2^5$$

$$= 1 + 2 + 0 + 8 + 0 + 32 = 43$$

- (2) Therefore, $100111_{(2)} \leftarrow$ Add (2) to the bottom right Therefore, $1111000_{(2)}$

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Al-Faez Exercises

- 1 Choose the correct answer from the following:**

- 1- The smallest unit of information is:
a. byte b. bit c. kilobyte d. megabyte
- 2- A bit can represent:
a. 1 state b. 2 states c. 4 states d. 8 states
- 3- A unit consisting of 8 bits is called:
a. bit b. byte c. kilobyte d. megabyte
- 4- 1 KB equals:
a. 1024 B b. 1000 B c. 8 B d. 256 B
- 5- 1 MB equals:
a. 1024 KB b. 1000 KB c. 1024 B d. 1024 GB
- 6- 1 GB equals:
a. 1024 MB b. 1000 MB c. 1024 KB d. 1024 TB
- 7- Decimal numbers use:
a. two digits b. eight digits c. sixteen digits d. ten digits
- 8- Binary numbers use:
a. two digits b. ten digits c. eight digits d. sixteen digits
- 9- Conversion from binary to decimal involves:
a. multiplication b. subtraction c. addition d. division
- 10- Conversion from decimal to binary involves:
a. repeated subtraction b. repeated division c. multiplication d. addition
- 11- Number of possibilities with 3 bits is:
a. 4 b. 6 c. 8 d. 16
- 12- Notation for a byte is:
a. B b. b c. KB d. MB
- 13- 1 TB equals:
a. 1024 GB b. 1000 GB c. 1024 MB d. 1024 KB
- 14- Binary number 1011(2) in decimal equals:
a. 10 b. 11 c. 12 d. 13
- 15- Decimal number 6 in binary equals:
a. 1010 b. 110 c. 111 d. 100

- 2 Put (✓) or (x) in front of each of the following sentences:

- 1- A bit is the smallest unit of information.
- 2- A bit can represent four different states.
- 3- A byte consists of 8 bits.

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- 4- 1 KB equals 1000 bytes.
- 5- 1 MB equals 1024 KB.
- 6- 1 GB equals 1024 MB.
- 7- Decimal numbers use two digits.
- 8- Binary numbers use only the digits 0 and 1.
- 9- Conversion from binary to decimal uses multiplication.
- 10- Conversion from decimal to binary uses repeated division by 2.
- 11- Three bits can represent 8 possibilities.
- 12- Notation for a byte is KB.
- 13- 1 TB equals 1024 GB.
- 14- The arrangement of bits represents actual information.
- 15- A bit can represent the orientation of a magnet.
- 16- Conversion from binary to decimal requires division.
- 17- Decimal numbers use ten digits from 0 to 9.
- 18- 1 byte can represent 256 possibilities.
- 19- Binary numbers are sometimes written with a subscript 2.
- 20- 6 in decimal equals 1010 in binary.

3 Complete the following with the suitable words in brackets:

(1024 – 8 – actual – byte – 11)

- 1- The arrangement of bits represents the information.
 - 2- The binary number $1011_{(2)}$ equals in decimal.
 - 3- A unit consisting of 8 bits is called a
 - 4- 1 KB equals bytes.
 - 5- Three bits can represent different possibilities.
- 4 Write the scientific concept for each of the following:**
- 1- The smallest unit of information in computing.
 - 2- A unit of information consisting of 8 bits.
 - 3- The system of representing numbers using ten digits from 0 to 9.
 - 4- The system of representing numbers using only 0 and 1.
 - 5- The process of changing a binary number into decimal form.
 - 6- The process of changing a decimal number into binary form.
 - 7- The unit of information equal to 1,024 bytes.
 - 8- The arrangement of bits that represents actual information.
 - 9- The unit of information equal to 1,024 megabytes.
 - 10- The notation sometimes placed at the lower right of a binary number.



Hexadecimal

1 Hexadecimal النظام السادس عشر

A method of representing numbers using the digits 0 to 9 and the alphabet letters A to F.
النظام السادس عشر: طريقة لتمثيل الأعداد باستخدام الأرقام من 0 إلى 9 والحروف الأبجدية من A إلى F

- A number represented in hexadecimal is sometimes written with a subscript (16) placed at the bottom right of the number.

الرقم الممثل في النظام السادس عشر يُكتب أحياناً مع الرقم (16) منخفض في الأسفل يمين الرقم

This is known as a (hexadecimal number). وهذا يعرف باسم (الرقم السادس عشر)

2 Correspondence Between Decimal, Binary, and Hexadecimal

التحويلات بين النظام العشري، الثنائي، والسادس عشر

Decimal	Binary	Hexadecimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8

Decimal	Binary	Hexadecimal
9	1001	9
10	1010	(³ A)
11	1011	(⁴ B)
12	1100	(⁵ C)
13	1101	(⁶ D)
14	1110	(⁷ E)
15	1111	(⁸ F)
16	10000	(⁹ 10)

3 Conversion between Decimal, Binary, and Hexadecimal

التحويل بين النظام العشري، والنظام الثنائي والنظام السادس عشر

1 Conversion from binary to hexadecimal التحويل من الثنائي إلى السادس عشر

Separate the binary number into groups of 4 digits starting from the least significant bit, افصل الرقم الثنائي إلى مجموعات من 4 أرقام بدءاً من الرقم الأقل قيمة، convert each group into a hexadecimal value, and arrange these values in sequence. حول كل مجموعة إلى قيمة السادس عشر، ورتب هذه القيم بالتسلسل

Example: Convert the binary number $10011010_{(2)}$ to a hexadecimal number.

مثال: حول الرقم الثنائي $10011010_{(2)}$ إلى رقم ست عشري

Separate into groups of 4 digits starting from the least significant bit: $1001/1010_{(2)}$

افصل إلى مجموعات من 4 أرقام بدءاً من أقل bit ذو قيمة: $1001/1010_{(2)}$

$1001_{(2)}$ is $(9_{(16)})$, $1010_{(2)}$ is $(A_{(16)})$, so $10011010_{(2)} = (9A_{(16)})$

2 Conversion from hexadecimal to binary

Convert each digit of the hexadecimal number into a 4-bit binary number, and arrange those numbers sequentially.

حول كل رقم من الرقم السادس عشر إلى رقم ثنائي مكون من 4 bit ، ورتب هذه الأرقام بالتسلسل

Example: Express hexadecimal $A4_{(16)}$ in binary.

مثال: عبر عن السادس عشر $A4_{(16)}$ في النظام الثنائي

$A_{(16)}$ is $(1010_{(2)})$, $4_{(16)}$ is $(0100_{(2)})$, so $A4_{(16)}$ is $(10100100_{(2)})$

3 Conversion from hexadecimal to decimal

Convert the hexadecimal number to a binary number, and then convert that binary number to a decimal number.

حول الرقم السداسي العشري إلى رقم ثنائي، ثم حول ذلك الرقم الثنائي إلى رقم عشري

Example: Express the hexadecimal $C6_{(16)}$ in decimal format.

مثال: عبر عن الرقم الست عشري $C6_{(16)}$ بالتنسيق العشري

First, to convert the hexadecimal $C6_{(16)}$ to binary, $C_{(16)}$ is $(1100_{(2)})$,

$6_{(16)}$ is $(0110_{(2)})$, so $C6_{(16)}$ is $(11000110_{(2)})$

ولذلك لتحويل الرقم السادس عشر $C6_{(16)}$ إلى ثنائي

Next, to convert the binary number $11000110_{(2)}$ into a decimal number,

$$11000110_{(2)} = (0 \times 1 + 1 \times 2^1 + 1 \times 2^2 + 0 \times 2^3 + 0 \times 2^4 + 0 \times 2^5 + 1 \times 2^6 + 1 \times 2^7) = 198$$

بعد ذلك، لتحويل الرقم الثنائي $11000110_{(2)}$ إلى رقم عشري

Warm Up

تحدى معلوماتك

Answer the following questions:

- 1 Convert the following binary numbers to hexadecimal, and the hexadecimal numbers to binary.

[1] $11011011_{(2)}$ [2] $11110110_{(2)}$ [3] $9E_{(16)}$

2 [1] $A5_{(16)}$

Explanation

الشرح

- 1 Separate the binary number into groups of four digits starting from the least significant bit, then convert each group into a hexadecimal number and list them sequentially.

$1101_{(2)}$ is $D_{(16)}$, $1011_{(2)}$ is $B_{(16)}$, so $11011011_{(2)}$ is $DB_{(16)}$

[2] $1111_{(2)}$ is $F_{(16)}$, $0110_{(2)}$ is $6_{(16)}$ so $11110110_{(2)}$ is $F6_{(16)}$

- [3] Convert each digit into a 4-bit binary number and list them sequentially.

$9_{(16)}$ is $1001_{(2)}$, $E_{(16)}$ is $1110_{(2)}$, so $9E_{(16)}$ is $10011110_{(2)}$

- (2) Convert from hexadecimal to binary, and then to decimal.

[1] $A_{(16)}$ is $1010_{(2)}$, $5_{(16)}$ is $0101_{(2)}$, so $A5_{(16)}$ is $10100101_{(2)}$

Therefore, $10100101_{(2)} = 1 \times 1 + 0 \times 2^1 + 1 \times 2^2 + 0 \times 2^3 + 0 \times 2^4 + 1 \times 2^5 + 0 \times 2^6 + 1 \times 2^7 = 165$



Al-Faez Exercises

1 Choose the correct answer from the following:

- Hexadecimal uses digits and letters from
a. 0-5 b. 0-9 & A-F c. 0-7 d. 1-6
- Subscript (16) indicates a
a. Binary number b. Decimal number
c. Hexadecimal number d. Octal number
- Binary number $1010_{(2)}$ equals hexadecimal
a. 9 b. C c. B d. A
- Conversion from binary to hexadecimal involves grouping by
a. 2 digits b. 3 digits c. 4 digits d. 5 digits
- Hexadecimal $A4_{(16)}$ in binary is
a. 10100100 b. 10101001 c. 10010100 d. 11001010
- Conversion from hexadecimal to decimal requires first converting to
a. Binary b. Octal c. Decimal d. Letters
- Decimal number 198 equals hexadecimal
a. 7E b. A4 c. 9A d. C6
- Each hexadecimal digit represents
a. 2 bits b. 3 bits c. 4 bits d. 5 bits
- Hexadecimal $C6_{(16)}$ in binary is
a. 11000110 b. 10100110 c. 11100110 d. 10010110
- Hexadecimal is a number system based on
a. 8 b. 10 c. 12 d. 16

2 Put (✓) or (x) in front of each of the following sentences:

- Hexadecimal numbers use digits 0-9 and letters A-F. ()
- Subscript (16) indicates a binary number. ()
- Each hexadecimal digit represents 4 binary bits. ()
- Conversion from binary to hexadecimal requires grouping by 3 digits. ()
- Hexadecimal $A4_{(16)}$ equals 10100100 in binary. ()

6- Conversion from hexadecimal to decimal requires converting to binary first.

7- Decimal number 198 equals hexadecimal 9A.

8- Hexadecimal system is based on 12 digits.

9- Binary number $1001_{(2)}$ equals hexadecimal 9.

10- Hexadecimal $C6_{(16)}$ in binary is 11000110.

11- Conversion from binary to hexadecimal adds value to each digit separately.

12- Hexadecimal numbers simplify representation of large binary numbers.

13- Each group of 4 binary digits converts to a single hexadecimal digit.

14- Hexadecimal digits include letters from G to L.

15- Subscript (16) is optional but helps identify hexadecimal numbers.

3 Complete the following with the suitable words in brackets:

(9A - 4 - 10100100 - 16 - binary)

1- Conversion from binary to hexadecimal involves separating the binary number into groups of digits.

2- Binary number $10011010_{(2)}$ is expressed in hexadecimal as

3- Hexadecimal $A4_{(16)}$ in binary is written as

4- Conversion from hexadecimal to decimal requires first converting to

5- Hexadecimal system is based on the number

4 Write the scientific concept for each of the following:

1- A number system that uses digits 0-9 and letters A-F.

2- The subscript (16) placed at the bottom right of a number.

3- The process of converting each 4-bit group of a binary number into a single hexadecimal digit.

4- The process of converting a hexadecimal number into binary before converting it to decimal.

5- A group of four binary digits representing one hexadecimal digit.

5 Complete the following with the suitable words:

1- Hexadecimal is a method of representing numbers using digits and letters A-F.

2- A number written with a subscript (16) is called a number.

3- Each hexadecimal digit corresponds to binary bits.

4- Hexadecimal $C6_{(16)}$ converted to binary is

5- Decimal number 198 equals hexadecimal

Lesson (4)

التمثيل الرقمي للأحرف

Digital Representation of Characters



1 Digital Representation of Characters

التمثيل الرقمي للأحرف

1 Character code: رمز الحرف

A unique numerical value assigned each character, symbol, etc.

قيمة رقمية فريدة يتم تعيينها لكل حرف، رمز، إلخ

2 Character code system: نظام رموز الأحرف

Summarizes the correspondence between characters and their respective character codes.

يلخص التحويلات بين الأحرف ورموز الأحرف الخاصة بكل منها



1 ASCII code: رماسكي

Only alphanumeric characters, symbols, and control characters (symbols used to control the computer).

فقط الأحرف الإنجليزية الأبجدية الرقمية والرموز وأحرف التحكم (الرموز المستخدمة للتحكم في الكمبيوتر).

No Japanese characters (*kanji, hiragana, or katakana*).

لا توجد أحرف يابانية (كانجي، هيراغانا، أو كاتاكانا).

		Most Significant 4 bits										
		Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001
Binary	Hexadecimal	0	1	Symbols for Controlling Computers (Omission)								
0000	0											
0001	1											
0010	2											
0011	3											
0100	4											
0101	5											
0110	6											
0111	7											
1000	8											
1001	9											
1010	A											
1011	B											
1100	C											
1101	D											
1110	E											
1111	F											

Example: Convert the string "Hello" into a binary character code and a hexadecimal character code Combine the most significant 4 bits and the least significant 4 bits.

مثال: حول السلسلة النصية "Hello" إلى رمز ثنائي ورمز السادس عشر، واجمع بين 4 بتات الأكثر أهمية و 4 بتات الأقل أهمية.

String	H	e	l	l	o
Character code (binary)	01001000	01100101	01101100	01101100	01101111
Character Code (hexadecimal)	48	65	6C	6C	6F

2 Unicode:

A character code standard that consolidates characters from around the world into a single character code.

معيّار ترميز أحرف يجمع الأحرف من جميع أنحاء العالم في رمز حرف واحد.

Due to differences in code assignments, there are variations such as UTF-8 and UTF-16. نظرًا للاختلافات في تعيينات الرمز هناك اختلافات مثل UTF-8 و UTF-16

3 Encoding:

الترميز

Representing a string with character codes. تمثيل سلسلة برموز الأحرف
The opposite is known as (decoding). والعكس يعرف بـ (فك التشفير)



4 Character corruption:

A phenomenon that occurs due to mismatched encoding and decoding methods.

ظاهرة تحدث بسبب عدم تطابق أساليب التشفير وفك التشفير غير المتطابقة

Font: The shape data of characters corresponding to character codes.

نمط: بيانات شكل الأحرف المقابلة لرموز الأحرف

Example: Sans-serif, Serif, Semi-cursive, etc.

على سبيل المثال: Sans-serif، Serif، وشبه مخطوطة، وما إلى ذلك

To display characters on a computer screen or printer output, two elements are required: → (character code) and → (font).

لعرض الأحرف على شاشة الكمبيوتر أو مخرجات الطابعة، يلزم وجود عنصرين: (رمز الحرف) و (النمط)

Warm Up

تحدي معلوماتك

Answer the following questions:

1 Choose the numbers or terms that best fit into the blanks [1] to [5] from the options A to H below.

Characters and symbols can also be represented by combinations of 0s and 1s. A system that maps characters and symbols to binary or hexadecimal is called a ([1]). There are several types within the ([1]), including ([2]), which accommodates the writing systems of countries around the world. Alphanumeric characters and symbols are represented by ([3]) byte, 1 byte can represent ([4]) types of characters.

A. 1 B. 2 C. 128 D. 256 E. Character code F. Character corruption
G. Unicode H. ASCII code

2 Use the character code table on the right to answer the following questions.

Binary	Hexadecimal	Most Significant 4 bits	Least Significant 4 bits							
			0000	0001	0010	0011	0100	0101	0110	0111
			0	1	2	3	4	5	6	7
0000	0	Symbols for Controlling Computers (Continued)	SP	0	0	P				
0001	1		!	1	A	Q	a	q		
0010	2		"	2	B	R	b	r		
0011	3		#	3	C	S	c	s		
0100	4		\$	4	D	T	d	t		
0101	5		%	5	E	U	e	u		
0110	6		&	6	F	V	f	v		
0111	7		'	7	G	W	g	w		
1000	8		(	8	H	X	h	x		
1001	9		)	9	I	Y	i	y		
1010	A		*	*	J	Z	j	z		
1011	B		+	+	K	[	k	[		
1100	C		,	,	L	\	l	\		
1101	D		-	-	M	]	m	]		
1110	E		.	.	N	^	n	^		
1111	F		/	/	O	_	o	_	DEL	

[1] Use binary to represent the character code for "M".

استخدم النظام الثنائي لتمثيل رمز الحرف "M".

[2] Use hexadecimal to represent the character code for "MILK".

استخدم النظام السادس عشر لتمثيل رمز الحرف "MILK".

[3] What is the character string corresponding to the character code "4C6F7665(16)?"

ما هي سلسلة الأحرف المقابلة للرقم الثنائي بنظام السادس عشر "4C6F766516"؟

Explanation

الشرح

1 [1] E [2] G [3] A [4] B [5] D

2 [1] From the character code table, the most significant 4 bits of "M" are 0100 and the least significant 4 bits are 1101; therefore, 01001101.

[2] According to the character code table, the character codes corresponding to "M, I, L, K" are 4D, 49, 4C, and 4B, respectively, in the order of most significant to least significant. Connecting these character codes results in 4D494C4B(16).

[3] Consider the character code as separated into "4C/6F/76/65".

"4C" corresponds to the character "L" because it is located at the intersection of the most significant 4 and the least significant C.

Similarly, "6F" corresponds to "o", "76" to "v", and "65" is "e", so the resulting character string is Love.

① Choose the correct answer from the following:

- The standard that consolidates characters from different languages is
a. ASCII b. Encoding c. Font d. Unicode
- A unique numerical value assigned to each character is called
a. Font b. Character code c. Decoding d. Corruption
- The system summarizing the correspondence between characters and codes is
a. Character code system b. Unicode
c. ASCII d. Font
- The phenomenon caused by mismatched encoding and decoding is
a. Font b. ASCII
c. Character corruption d. UTF-8
- Required elements to display characters on screen or printer are
a. Font and code b. Encoding and decoding
c. ASCII and Unicode d. UTF-16

② Put (✓) or (x) in front of each of the following sentences:

- ASCII code supports Japanese characters. ()
- Unicode consolidates characters from all over the world. ()
- Character code assigns a unique numerical value to each symbol. ()
- Encoding is the process of converting a string into character codes. ()
- Character corruption occurs when encoding and decoding match perfectly. ()
- Fonts represent the shape of characters linked to character codes. ()
- UTF-8 and UTF-16 are variations of Unicode. ()
- Displaying characters on a screen only requires a font. ()
- ASCII includes alphanumeric characters, symbols, and control characters. ()
- Decoding is the same as encoding. ()

③ Complete the following with the suitable words in brackets:

(Encoding – Character code – Character corruption – Font – characters)

- A is a unique numerical value assigned to each character or symbol.
- The Character code system summarizes the correspondence between and their respective codes.
- represents a string with character codes, while the opposite process is decoding.
- A occurs when encoding and decoding methods do not match.
- Two elements required to display characters on a computer screen or printer are Character code and



Numerical Calculations ①

Addition and Subtraction of Binary Numbers

جمع وطرح الأرقام الثنائية

- Addition and subtraction in binary numbers are performed digit by digit, just like in decimal numbers. يتم إجراء عمليات الجمع والطرح في الأعداد الثنائية رقماً بعد رقم، تماماً كما هو الحال في الأعداد العشرية.

① Binary addition الجمع الثنائي

In binary addition, the place value carries over by one position when the sum reaches 2.

في الجمع الثنائي، يتم ترحيل القيمة بمقدار منزلة واحدة عندما يصل المجموع إلى 2

$$0_{(2)} + 0_{(2)} = (10_{(2)}), 0_{(2)} + 1_{(2)} = (21_{(2)}), 1_{(2)} + 1_{(2)} = (310_{(2)}), 1_{(2)} + 1_{(2)} = (411_{(2)})$$

Example: Addition of binary numbers $0101_{(2)} + 1001_{(2)}$

مثال: جمع الأعداد الثنائية

$$\begin{array}{r} \text{Carry } 1 \\ 0101 \\ + 1001 \\ \hline (51110_{(2)}) \end{array}$$

When two 1s are added together, a carry of 1 is generated to the next higher digit.

- When two 1s are added together, a carry of 1 is generated to the next higher digit. عند جمع رقمين 1 معاً، يتم توليد حمل 1 إلى الرقم الأعلى التالي.

② Binary subtraction الطرح الثنائي

In binary subtraction, when the minuend is insufficient, a value of 2 is borrowed from the next higher digit. في الطرح الثنائي، عندما لا يكون المطروح منه كافياً، يتم استعارة قيمة 2 من الخانة الأعلى التالية.

$$0_{(2)} + 0_{(2)} = (60_{(2)}), 1_{(2)} - 0_{(2)} = (71_{(2)}), 1_{(2)} - 1_{(2)} = (80_{(2)}), 10_{(2)} - 1_{(2)} = (91_{(2)})$$

Example: Subtraction of binary numbers $1010_{(2)} - 0110_{(2)}$

مثال: طرح الأعداد الثنائية

$$\begin{array}{r} \text{Borrow } 1 \\ 1010_{(2)} \\ - 0110_{(2)} \\ \hline (100100_{(2)}) \end{array}$$

When 1 is borrowed from the higher digit, it becomes two 1s in the lower digit.

- When 1 is borrowed from the higher digit, it becomes two 1s in the lower digit. عندما يتم اقتراض 1 من الرقم الأعلى، يصبح هناك اثنان 1s في الرقم الأدنى.

Warm Up

تحديد معلوماتك

• Perform the following binary calculations.

- (1) $0101_{(2)} + 1010_{(2)}$ (2) $1011_{(2)} + 0011_{(2)}$
 (3) $1011_{(2)} - 0101_{(2)}$ (4) $1101_{(2)} - 1010_{(2)}$

Explanation

الشرح

①

$$\begin{array}{r} 0101_{(2)} \\ + 1010_{(2)} \\ \hline 1111_{(2)} \end{array}$$

Therefore, $1111_{(2)}$

②

$$\begin{array}{r} 1011_{(2)} \\ + 0011_{(2)} \\ \hline 1110_{(2)} \end{array}$$

Therefore, $1110_{(2)}$

③

$$\begin{array}{r} 0101_{(2)} \\ - 0101_{(2)} \\ \hline 0110_{(2)} \end{array}$$

Therefore, $0110_{(2)}$

④

$$\begin{array}{r} 1011_{(2)} \\ - 1010_{(2)} \\ \hline 0011_{(2)} \end{array}$$

Therefore, $0011_{(2)}$



Al-Faez Exercises

① Choose the correct answer from the following:

- Addition and subtraction in binary numbers are performed
 a. randomly b. digit by digit
 c. in reverse d. by grouping
- In binary addition, a carry is generated when the sum reaches
 a. 1 b. 4
 c. 3 d. 2
- In binary subtraction, borrowing occurs when the is insufficient.
 a. subtrahend b. carry
 c. minuend d. sum
- When two 1s are added together in binary, a carry of is generated.
 a. 1 b. 0
 c. 2 d. 3

5- Binary addition and subtraction follow rules similar to

- a. hexadecimal numbers b. decimal numbers
 c. octal numbers d. fractions

② Put (✓) or (x) in front of each of the following sentences:

- Binary addition and subtraction are performed digit by digit. ()
- A carry is generated in binary addition when the sum reaches 1. ()
- Borrowing in binary subtraction takes a value of 2 from the next higher digit. ()
- Adding 0 + 1 in binary produces a carry. ()
- Two 1s added in binary generate a carry to the next higher digit. ()
- Binary subtraction never requires borrowing. ()
- Binary arithmetic rules are different from decimal arithmetic. ()
- Borrowing in binary subtraction changes the lower digit into two 1s. ()
- The sum of 1 + 1 in binary is written as 10₍₂₎. ()
- Binary addition does not produce carries in any case. ()

③ Complete the following with the suitable words in brackets:

(2 - 2 - 1 - digit by digit - decimal)

- Binary addition and subtraction are performed
- A carry is generated in binary addition when the sum reaches
- Borrowing in binary subtraction takes a value of from the next higher digit.
- When two 1s are added together in binary, a carry of is generated.
- Binary arithmetic follows rules similar to numbers.

④ Write the scientific concept for each of the following:

- The arithmetic operation performed in binary numbers digit by digit.
- The value carried to the next higher digit when binary sum reaches 2.
- The value borrowed from the next higher digit in binary subtraction.
- The situation when two 1s are added together and affect the next digit.
- The system whose arithmetic rules binary addition and subtraction follow.

Numerical Calculations ②



1 Representation of Negative Numbers Using Complements

تمثيل الأرقام السالبة باستخدام المتممات

1 Complement المكمّل/المتمم

The smallest number which, when added to a given natural number, produces a carry to the next higher digit.

المنم: هو أصغر رقم، عند إضافته إلى عدد طبيعي معين، يؤدي إلى الانتقال إلى الرقم الأعلى التالي

Complements are used for representing negative numbers in computers.

نستخدم المتممات لتمثيل الأرقام السالبة في أجهزة الكمبيوتر

1 10's complement المكمّل العشري

In decimal, the smallest number which, when added, produces a carry to the next higher digit.

المكمّل العشري في النظام العشري هو أصغر رقم ينتج، عند إضافته، يؤدي إلى الانتقال إلى الرقم الأعلى التالي

Examples:

The 10's complement of 71 is (29), and the 10's complement of 635 is (365).

المنم العشري للرقم 71 هو 29، والمنم العشري للرقم 635 هو 365

2 9's complement المكمّل للتسعة

In binary, the smallest number which, when added, produces a carry to the next higher digit.

في النظام الثنائي، هو أصغر رقم، عند إضافته، يؤدي إلى الانتقال إلى الرقم الأعلى التالي المكمّل للتسعة

How to calculate the 2's complement كيفية حساب المكمّل الثنائي

For each digit of the original binary number, invert 0s to 1s and 1s to 0s, then add 1 at the end to mechanically obtain the result.

لكل رقم من الرقم الثنائي الأصلي، قلب 0 إلى 1 و 1 إلى 0، ثم أضف 1 في النهاية للحصول على النتيجة ميكانيكياً

Examples:

The 2's complement of 0101₍₂₎

المكمّل الثنائي للرقم 1010

By inverting each digit from 0 to 1 and from 1 to 0,

عن طريق قلب كل رقم من 0 إلى 1 ومن 1 إلى 0

it becomes (1010₍₂₎).

Finally, by adding 1, it becomes (11011₍₂₎).

أخيراً، من خلال إضافة 1

Subtraction Using Complements

الطرح باستخدام المكملات

A computer uses subtraction by performing addition with complements.

يستخدم الكمبيوتر الطرح عن طريق إجراء عملية جمع مع المكملات

Subtraction process: عملية الطرح

- 1) Find the (complement) of the subtrahend. أوجد المكمّل للمطروح
- 2) Use the complement to perform (addition). استخدم المكمّل لإجراء الجمع
- 3) Ignore the leading digits of the calculation result and provide the answer. تجاهل الخانات الرئيسية للنتيجة الحساب وقدم الإجابة

Example 1:

Subtraction of "8 - 6" in decimal. طرح 8 - 6 في النظام العشري

- 1) The 10's complement of the decimal number 6 is (104) المنم للعدد العشري 6 هو (104)
- 2) $8 - 6 \rightarrow 8(11 + 4) = (1212)$
- 3) Ignoring the leading digit, (12) تجاهل الرقم الرائد

Example 2:

Subtraction of "1000₍₂₎ - 0111₍₂₎" in binary.

- 1) The 2's complement of the binary number 0111₍₂₎ is (141001₍₂₎)
- 2) $1000_{(2)} 0111_{(2)} \rightarrow 1000_{(2)} (15 + 1001_{(2)}) = (1610001_{(2)})$
- 3) Ignoring the leading digit, (170001₍₂₎)



Warm Up

تحدي معلوماتك

Answer the following questions.

- (1) What is the complement of the following binary number?
[1] 1001₍₂₎ [2] 0100₍₂₎
- (2) Use complements to perform the following binary subtractions.
[1] 1100₍₂₎ - 0111₍₂₎ [2] 1110₍₂₎ - 1001₍₂₎



Explanation

الشرح

- (1) [1] By inverting each digit from 0 to 1 and from 1 to 0, it becomes 0110₍₂₎
Finally, by adding 1, it becomes 0111₍₂₎
- [2] By inverting each digit from 0 to 1 and from 1 to 0, it becomes 1001₍₂₎
Finally, by adding 1, it becomes 1010₍₂₎

(2) [1] The complement of the binary number $0111_{(2)}$ is $1001_{(2)}$, so

$$1100_{(2)} - 0111_{(2)} \rightarrow 1100_{(2)} + 1001_{(2)} = 10101_{(2)}$$

By ignoring the leading digit, $0101_{(2)}$

[2] The complement of the binary number $1001_{(2)}$ is $0111_{(2)}$, therefore,

$$1110_{(2)} - 1001_{(2)} \rightarrow 1110_{(2)} + 0111_{(2)} = 10101_{(2)}$$

By ignoring the leading digit, $0101_{(2)}$



Al-Faez Exercises

1 Choose the correct answer from the following:

- The smallest number which, when added to a given natural number, produces a carry to the next higher digit is called
 a. sum
 b. complement
 c. difference
 d. product
- In decimal system, the complement used to represent negative numbers is
 a. 2's
 b. 9's
 c. 10's
 d. binary
- The process of inverting 0s to 1s and 1s to 0s, then adding 1 is used to calculate
 a. 9's complement
 b. subtraction
 c. decimal sum
 d. 2's complement
- Subtraction in computers is performed using
 a. multiplication
 b. division
 c. addition with complements
 d. shifting
- Ignoring the leading digit in subtraction using complements gives
 a. the result
 b. the sum
 c. the complement
 d. the carry

2 Put (✓) or (x) in front of each of the following sentences:

- Complements are used for representing negative numbers in computers. ()
- The 10's complement is used in the binary system. ()
- The 2's complement is calculated by inverting each binary digit and then adding 1. ()
- Subtraction in computers is done by directly subtracting numbers without using complements. ()

5- Ignoring the leading digit after addition with complements gives the correct subtraction result.

- The 9's complement is used in the decimal system. ()
- The smallest number which produces a carry to the next higher digit is called a complement. ()
- Inverting 0s to 1s and 1s to 0s is sufficient to get the 2's complement. ()
- Addition with complements can simplify subtraction operations in computers. ()
- The 10's complement of 635 is 365. ()

3 Complete the following with the suitable words in brackets:

- The process of representing negative numbers in computers uses
- The complement in decimal system that produces a carry to the next higher digit is called
- To calculate the 2's complement of a binary number, first each digit and then add 1.
- Subtraction in computers is performed using with complements.
- Ignoring the leading digit after addition with complements provides the

4 Write the scientific concept for each of the following:

- The smallest number which, when added to a given natural number, produces a carry to the next higher digit.
- The method used in decimal system to represent negative numbers by producing a carry to the next higher digit.
- The binary representation of a negative number obtained by inverting each digit and then adding 1.
- The operation performed in computers by using addition with complements to obtain subtraction results.
- Ignoring the leading digit in addition with complements gives the final.

Digitalization of Sound

1 Sound الصوت

1 Sound الصوت

A phenomenon transmitted through the vibration of air. Waveform (analog) data.
الصوت: هو ظاهرة تنتقل عبر اهتزاز جزيئات الهواء. (موجة تناظرية)

- For audio data on CDs, etc., sound is converted into (digital) data.

بالنسبة للبيانات الصوتية الموجودة على الأقراص المضغوطة، وما إلى ذلك، يتم تحويل الصوت إلى بيانات (رقمية)

2 Frequency التردد

The number of waves contained in one second.

التردد: هو عدد الموجات التي تمر في ثانية واحدة

The unit is (hertz) [Symbol: (Hz)].

الوحدة قياس التردد هي (Hertz) الرمز (HZ)

3 Period الفترة

The time it takes for one wave to propagate. The unit is (seconds).

الفترة: هي الوقت الذي تستغرقه موجة واحدة للانتشار. وحدة القياس هي ثانية

2 Digitalization of Sound

رقمنة الصوت

1 Pulse Code Modulation (PCM) method

طريقة التعديل بالنمضات الرقمية

A method for digitizing audio analog data.

طريقة لرقمنة البيانات الصوتية التناظرية

Convert sound information into binary code.

تحويل البيانات الصوتية إلى شفرة ثنائية

Steps for digitizing sound using the PCM method:

خطوات رقمنة الصوت باستخدام طريقة (PCM)

1 Sampling: أخذ العينات

The horizontal axis (time) divided at regular intervals,

يتم تقسيم المحور الأفقي (الزمن) على فترات زمنية منتظمة

and the wave height (voltage strength) is extracted. ويتم استخراج ارتفاع الموجة (قوة الجهد)

The extracted points are referred to as (sample points). تُعرف النقاط المستخلصة باسم (نقاط العينة).

- Sampling period: The time interval used to divide when sampling.

فترة أخذ العينات: الفترة الزمنية المستخدمة للتقسيم عند أخذ العينات



Sampling frequency: The number of samples taken per second.

تردد أخذ العينات: عدد العينات المأخوذة في الثانية الواحدة

2 Quantization: التحويل الكمي

The vertical axis (voltage) is divided at regular intervals,

يتم تقسيم المحور الرأسي (الجهد) على فترات منتظمة

and the wave heights obtained from sampling are converted to the nearest values on

the vertical scale. ويتم تحويل ارتفاعات الموجة التي تم الحصول عليها من أخذ العينات إلى أقرب القيم على المقياس الرأسي

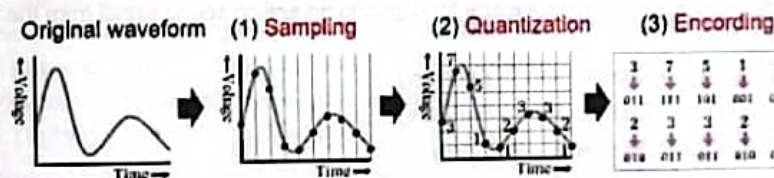
- Quantization bit depth: عمق ال bit الكمي

This determines the number of levels into which the range is divided during quantization.

عمق ال bit الكمي: يحدد عدد المستويات التي يتم تقسيم النطاق إليها أثناء التحويل الكمي

3 Encoding: الترميز

Express the quantized values in binary form. يتم التعبير عن القيم المقدرة كمياً في صورة ثنائية



2 Digitization and Data Volume

الرقمنة وحجم البيانات

As the sampling frequency and the quantization bit depth (increase), the sound becomes closer to the original analog waveform.

كلما زادت تردد أخذ العينات والتحويل الكمي، أصبح الصوت أقرب إلى الموجة التناظرية الأصلية.

This causes the sound quality to (improve); however, the amount of data also (increases).

هذا يسبب (تحسناً) في جودة الصوت؛ ومع ذلك، فإن كمية البيانات أيضاً تزيد

3 Sampling theorem

نظرية أخذ العينات

If the sampling frequency exceeds (twice) the highest frequency contained in the original analog waveform,

إذا تجاوز تردد أخذ العينات ضعف أعلى تردد موجود في الموجة التناظرية الأصلية

the waveform of the original analog signal can be accurately reconstructed from the digitized data.

يمكن إعادة بناء شكل الموجة للإشارة التناظرية الأصلية بدقة من البيانات الرقمية

3 Amount of Sound Data

كمية بيانات الصوت

1 Channels: القنوات

عدد الإشارات المستخدمة عند نقل الصوت. The number of signals used when transmitting sound.

A method of playback using a single signal is called (monaural).
 إحدى طريقة التشغيل التي تستخدم إشارة واحدة (أحادية)

and a method of playback using two different signals is called (stereo).
 وطريقة التشغيل باستخدام إشارتين مختلفتين تسمى (مجسمة ستيريو)

2 How to Calculate the Amount of Audio Data كيفية حساب كمية البيانات الصوتية

Data amount [bits] per second = (Sampling frequency × Quantization bit depth × Number of channels)

كمية البيانات (bit) في الثانية = (تردد أخذ العينات × عمق bit الكمي × عدد القنوات)

Warm Up تحلى معلوماتك

Answer the following questions.

- Choose the one appropriate procedure for digitizing an analog sound signal from the options A to D.
 A) Sampling → Quantization → Encoding
 B) Encoding → Quantization → Sampling
 C) Quantization Sampling → Encoding
 D) Quantization → Encoding → Sampling
- Calculate the data amount for 1 second in kilobytes (KB) when digitizing music at a sampling frequency of 44,100 Hz, a quantization bit depth of 16 bits, and in 2-channel stereo. However, assume that 1 KB = 1,000 B, and round off to the nearest whole number.
- Calculate the data amount for 1 minute in megabytes (MB) when digitizing music at a sampling frequency of 44.1 kHz, a quantization bit depth of 24 bits, and in 2-channel stereo. However, assume that 1 KB = 1,000 B, and 1 MB = 1,000 KB, and round off to the nearest whole number.

Explanation الشرح

- A
- Data amount [bits] per second = Sampling frequency × Quantization bit depth × Number of channels Therefore, the amount of data per second is 44,100 [Hz] 16 [bits] 2 [channels]

= 1,411,200 [bits]. Since 1 B = 8 bits, 1,411,200 [bits] ÷ 8 = 176,400 [B]
 1 KB = 1,000 B, so 176,400 [B] ÷ 1,000 = 176.4 [KB] 176 KB

44.1 kHz = 44.1 × 1,000 44,100 Hz, and since 2 minutes = 120 seconds, the data amount per minute is 44,100 [Hz] × 24 [bits] × 2 [channels] × 60 [seconds] = 127,008,000 [bits]

Since 1 B = 8 bits, 127,008,000 [bits] ÷ 8 = 15,876,000 [B].

1 KB = 1,000 B, 1 GB = 1,000 MB, therefore,

15,876,000 [B] ÷ 1,000 = 15.876 [MB] = 16 [MB]



Al-Faez Exercises

1 Choose the correct answer from the following:

- The phenomenon transmitted through the vibration of air is called
 a. Sound b. Frequency c. Noise d. Waveform
- The unit used to measure frequency is
 a. Volt b. Bit c. Hertz d. Byte
- The process of converting analog sound information into binary code is known as
 a. Sampling b. Encoding c. Quantization d. PCM
- Increasing the sampling frequency and quantization bit depth leads to
 a. Lower quality b. Less data c. Better quality d. No change
- Playback using two different signals is called
 a. Digital b. Stereo c. Analog d. Monaural

2 Put (✓) or (x) in front of each of the following sentences:

- Sound is transmitted through the vibration of air. ()
- The unit of frequency is measured in seconds. ()
- One wave's propagation time is called its period. ()
- Sampling means dividing the vertical axis (voltage) at regular intervals. ()
- Quantization converts sampled wave heights to the nearest level on the vertical scale. ()
- Encoding expresses quantized values in binary form. ()
- Lower sampling frequency and bit depth produce better sound quality. ()
- The sampling theorem states that the sampling frequency must exceed twice the highest frequency in the original waveform. ()
- Monaural playback uses two different signals. ()
- The amount of audio data depends on sampling frequency, quantization bit depth, and number of channels. ()

3 Complete the following with the suitable words in brackets:

(per second – CDs – Frequency – Monaural – Encoding)

- 1- Sound is converted into digital data on media such as
- 2- The number of waves contained in one second is called
- 3- The process of expressing quantized values in binary form is called
- 4- A playback method using a single signal is called
- 5- Data amount is calculated as sampling frequency $\times$ Quantization bit depth $\times$ Number of channels. per second

4 Write the scientific concept for each of the following:

- 1- A phenomenon transmitted through the vibration of air.
- 2- The number of waves contained in one second.
- 3- The process of dividing the time axis into intervals and extracting wave heights.
- 4- The process of converting sampled wave heights to the nearest level on the vertical scale.
- 5- The method used to digitize analog audio data by converting it into binary code.

Digitization of Images



1 Digitization of Images رقمنة الصور

1 Pixel البكسل

The smallest unit that composes an image. أصغر وحدة تشكل صورة

A digital image is represented by an arrangement of pixels.

يتم تمثيل الصورة الرقمية بترتيب وحدات البكسل

2 Procedure for Digitization of Images إجراءات رقمنة الصور

Images captured by digital cameras or image scanners are digitized and imported into a computer through the following process.

يتم رقمنة الصور التي يتم التقاطها بالكاميرات الرقمية أو ماسحات الصور استيرادها إلى الكمبيوتر من خلال العملية التالية

1 Sampling: أخذ العينات

The image is divided into pixels, and the representative brightness is extracted.

يتم تقسيم الصورة إلى وحدات بكسل، ويتم استخراج مستوى السطوع التمثيلي لكل بكسل

• Resolution: The degree of fineness of pixels when sampling.

الدقة: هي درجة دقة ووضوح البكسل عند أخذ العينات

↪ The unit of resolution is (dpi).

↪ It is sometimes expressed as vertical pixels $\times$ horizontal pixels.

↪ وحدة الدقة هي (dpi) يتم التعبير عنها أحياناً بـ Pixels رأسي $\times$ Pixels أفقي

2 Quantization: التقدير الرقمي

Converts the brightness of each pixel into numerical values divided into several levels.

يحول سطوع كل بكسل إلى قيم رقمية مقسمة إلى عدة مستويات

• Gradation: التدرج

The level value that represents the intensity of color per pixel.

قيمة المستوى التي تمثل كثافة اللون لكل بكسل

The gradation is determined by the number of bits allocated to each pixel.

يتم تحديد التدرج من خلال عدد bits المخصصة لكل بكسل

Example: At 256 gradients (8 bits), it represents 256 levels from 0 to 255.

مثال: عند 256 تدرجاً (8 bit)، فإنها تمثل 256 مستوى من 0 إلى 255

3 Encoding: الترميز

Expressing quantized values in binary numbers (0 and 1).

: التعبير عن القيم الكمية بالأرقام الثنائية (0 و 1)



(2) Quantization

4	5	6	7
3	4	5	6
2	3	4	5
1	2	3	4

(3) Encoding

100	101	110	111
011	100	101	110
010	011	100	101
001	010	011	100

Digitization and Data Volume

الرقمنة وحجم البيانات

- 1 Data amount of an image [bits] = (Number of pixels (vertical pixels x horizontal pixels) x Number of bits for color information)

حجم بيانات الصورة [bit] = (عدد بكسل الرأسى x عدد بكسل الأفقى) x عدد bits لمعلومات اللون

- 2 The (higher) the values of resolution and gradation, the smoother the image obtained and the image quality (improves), but the amount of data (increases).
كما زادت قيم الدقة والتدرج، أصبحت الصورة التي يتم الحصول عليها أكثر سلاسة و(تحسنت) جودة الصورة، لكن (زادت) حجم البيانات

Raster Format and Vector Format

تنسيق النقطي وتنسيق المتجه

1 Raster format: التنسيق النقطي

- An arrangement of pixels used to represent text or shapes.

طريقة لتمثيل النصوص أو الأشكال باستخدام شبكة من النقاط

- It appears jagged when enlarged (this appearance is called (jaggies)).

عند تكبير الصورة تظهر متكررة أو متعرجة وهذا يُسمى (التعرجات)

- Images are drawn using (painting software). يتم رسم الصور باستخدام (برنامج تلوين)

2 Vector format: تنسيق المتجهات

A representation that includes information about coordinates of points composing the image,
تمثيل يتضمن معلومات حول إحداثيات النقاط المكونة للصورة

as well as the angles and thickness of the lines connecting them.

بالإضافة إلى زوايا وسماك الخطوط التي تربط بينها.

- Images are drawn using (drawing software). يتم رسم الصور باستخدام (برنامج رسم)

Color Representation

تمثيل اللون



1 Three primary colors of light:

ثلاثة ألوان أساسية للضوء

The three colors of red, green, and blue.
الألوان الثلاثة الأحمر والأخضر والأزرق

When these colors of light are mixed, the brightness increases and approaches (white).
عندما تمتزج ألوان الضوء هذه بزيادة السطوع ويقترب من اللون الأبيض

Three primary colors of pigment:

الألوان الأساسية الثلاثة للصبغة

- The three colors of cyan, magenta, and yellow.
الألوان الثلاثة: السماوي والأرجواني والأصفر

- Mixing these colors will darken them and bring them closer to (black).

وخلط هذه الألوان يؤدي إلى تعميقها وتقريبها من (الأسود)

2 Additive color mixing:

مزج الألوان المضافة

- A method of representing colors by combining the three primary colors of light.

طريقة لتمثيل الألوان من خلال الجمع بين الألوان الأساسية الثلاثة للضوء

- Used in televisions and computer displays.
مستخدمة في شاشات التلفاز والكمبيوتر



3 Subtractive color mixing:

مزج الألوان الطرحي

- A method of representing colors by combining the three primary colors of pigment.

طريقة لتمثيل الألوان من خلال الجمع بين الألوان الأساسية للصبغة

- Used in color printers.
مستخدمة في الطابعات الملونة



4 24-bit full color:

الألوان الكاملة

Each color of red, green, and blue is represented in 256 levels (2⁸ = 8 bits) x 324 bits.

يتم تمثيل كل لون من الألوان الأحمر والأخضر والأزرق في 256 مستوى (2⁸ = 8 بت) x 324 بت

Warm Up

تحدى معلوماتك

• Answer the following questions.

- 1 Rearrange the following steps A to C in the order of converting an image into digital data.

A) Replace the brightness levels of each region with integer values according to a fixed rule.

B) Divide the image into evenly spaced grid sections.

C) Represent integers in binary.

- 2 Choose all statements that correctly describe the digital representation of images from the options A to D, and answer using the letters.

A) The raster format appears as having noticeably jagged edges when the image is enlarged.

B) The raster format is suitable for expressing images with clear contours, such as logos.

C) Vector format represents images by incorporating information such as the coordinates of points and the thickness of lines.

D) Painting software is used to create vector graphics.

- 3 What is the data amount of a 24-bit full-color image with a resolution of

1,280 x 720 pixels in megabytes? For this question, assume that

1 KB = 1,000 B and 1 MB 1,000 KB, and round your answer to two decimal places.



Explanation

الشرح

- 1 BAC
- 2 A. C
- 3 The amount of data in the image is,
 $1,280 \times 720 \times 24 \text{ [bits]} = 22,118,400 \text{ [bits]}$
 Since 1 B equals 8 bits, $22,118,400 \div 8 = 2,764,800 \text{ [B]}$.
 1 KB 1,000 B, 1 MB 1,000 KB, therefore,
 $2,764,800 \text{ [B]} \div 1,000 = 2,764.8 \text{ [KB]} \approx 2.76 \text{ [MB]}$



Al-Faez Exercises

1 Choose the correct answer from the following:

- 1- The smallest unit that composes an image is called
 a. pixel b. byte c. dot d. bit
- 2- The process that divides an image into pixels and extracts brightness is called.....
 a. encoding b. sampling c. quantization d. compression
- 3- The degree of fineness of pixels during sampling is called.....
 a. gradation b. resolution c. brightness d. tone
- 4- The process that converts pixel brightness into numerical values is.....
 a. quantization b. encoding c. filtering d. scanning
- 5- The level value that represents color intensity per pixel is called.....
 a. resolution b. gradation c. saturation d. tone
- 6- Expressing quantized values in binary numbers is called.....
 a. encoding b. compressing c. decoding d. sampling
- 7- Vector format represents images using.....
 a. pixels b. coordinates c. dots d. texture
- 8- The method used in color printers is.....
 a. additive mixing b. subtractive mixing c. neutral mixing d. gradient mixing
- 9- Raster images are created using.....
 a. painting software b. drawing software
 c. animation tools d. vector apps
- 10- The three primary colors of light are.....
 a. cyan, magenta, yellow b. cyan, yellow, black
 c. red, yellow, blue d. red, green, blue

2 Put (✓) or (x) in front of each of the following sentences:

- 1- A pixel is the smallest unit that composes a digital image. ()
- 2- A digital image is represented by an arrangement of pixels. ()
- 3- Sampling divides the image into pixels and extracts representative brightness. ()
- 4- Resolution refers to the fineness of pixels during sampling. ()
- 5- The unit of resolution is measured in dpi. ()
- 6- Quantization converts the brightness of each pixel into several levels of numerical values. ()
- 7- Gradation represents the intensity of color per pixel. ()
- 8- At 8 bits per pixel, there are 128 levels from 0 to 127. ()
- 9- Encoding expresses quantized values in binary numbers. ()
- 10- Increasing resolution and gradation decreases image quality. ()
- 11- Higher resolution and gradation increase the data volume of an image. ()
- 12- Raster images may appear jagged when enlarged. ()
- 13- The jagged appearance of raster images is called "jaggies." ()
- 14- Vector images are composed of pixel arrangements. ()
- 15- Vector images are drawn using drawing software. ()
- 16- Raster images are drawn using painting software. ()
- 17- The three primary colors of light are cyan, magenta, and yellow. ()
- 18- Mixing the three primary colors of light increases brightness and moves toward white. ()
- 19- Subtractive color mixing is used in color printers. ()
- 20- Additive color mixing is used in televisions and computer displays. ()

3 Complete the following with the suitable words in brackets:

(quantization – resolution – additive color mixing – pixels – sampling)

- 1- Mixing red, green, and blue light to produce white is called
- 2- A digital image is represented by an arrangement of
- 3- The process of dividing an image into pixels and extracting brightness is called
- 4- The degree of fineness of pixels during sampling is known as
- 5- The process that converts pixel brightness into numerical values is called

④ Write the scientific concept for each of the following:

- 1- The smallest unit that composes an image and forms its structure.
- 2- The process of dividing an image into pixels and extracting representative brightness.
- 3- The degree of fineness of pixels during the sampling process, measured in dpi.
- 4- The process of converting the brightness of each pixel into numerical levels.
- 5- The value level representing the intensity of color per pixel.
- 6- The process of expressing quantized values in binary numbers (0 and 1).
- 7- The total amount of image data obtained from the number of pixels multiplied by the number of bits per pixel.
- 8- The jagged appearance seen when enlarging raster images.
- 9- The method of representing colors by combining red, green, and blue light.
- 10- The method of representing colors by combining cyan, magenta, and yellow pigments.

⑤ Complete the following with the suitable words:

- 1- The level value that represents color intensity per pixel is called
- 2- Expressing quantized values in binary numbers is called
- 3- The smallest unit that composes an image is called
- 4- The jagged appearance seen when enlarging raster images is called
- 5- Mixing cyan, magenta, and yellow pigments to produce black is called

Lesson (9)

التمثيل الرقمي
وضغط الفيديو

Digital Representation and Compression Technology for Videos

Unit Six



1 Mechanism of Videos آلية الفيديو

① Video فيديو

An electronic medium that creates the illusion of movement by displaying a series of still images in succession.



وسيط إلكتروني يخلق وهم الحركة من خلال عرض سلسلة من الصور الثابتة على التوالي

It utilizes the (afterimage phenomenon), which occurs due to the characteristics of human vision. ويستخدم (ظاهرة الصورة الباقية)، التي تحدث بسبب خصائص الرؤية البشرية

② Frame: الإطار

Each still image that composes a video. كل صورة ثابتة تشكل مقطع فيديو



③ Frame rate: معدل الإطارات

The number of frames displayed per second. The unit is (fps).

عدد الإطارات المعروضة في الثانية. الوحدة هي (fps)

The (higher) the frame rate number, the smoother the video will appear, and the (larger) the data size will become.

كلما كان رقم معدل الإطارات (أعلى)، كلما ظهر الفيديو أكثر سلاسة، وأصبح حجم البيانات (أكبر)

④ How to Calculate the Amount of Video Data.

طريقة حساب حجم بيانات الفيديو

Amount of video data =

(Amount of image data [B] x Frame rate [fps] x Time [seconds])

حجم بيانات الفيديو = (حجم بيانات الصورة [B] x معدل الإطارات [fps] x الوقت [ثانية])

2 Data Compression ضغط البيانات

① Compression: الضغط

A process of reducing the amount of data as much as possible while preserving the content of the data. عملية تقليل حجم البيانات بقدر ممكن مع الحفاظ على محتوى البيانات

② Decompression: فك الضغط

A process of restoring compressed data to its original state.

عملية استعادة البيانات المضغوطة إلى حالتها الأصلية



③ Compression ratio: نسبة الضغط

The extent to which data has been compressed. المدى الذي تم به ضغط البيانات

Compression ratio [%] =

$$\frac{\text{Amount of data after compression}}{\text{Original amount of data}} \times 100$$
 نسبة الضغط = (حجم البيانات بعد الضغط) / (حجم البيانات الأصلي) × 100

③ Lossless Compression and Lossy Compression: الضغط غير الفاقد والضغط الفاقد

① Lossless compression: الضغط غير الفاقد

A compression method that allows for the complete restoration of the original data from the compressed data. طريقة ضغط تسمح بالاستعادة الكاملة للبيانات الأصلية من البيانات المضغوطة

② Used for compressing information such as text or program data.

يستخدم لضغط البيانات مثل بيانات النص أو البرنامج

③ Lossy compression: الضغط مع فقدان البيانات

A compression method in which the original data cannot be restored from the compressed data. طريقة ضغط لا يمكن من خلالها استعادة البيانات الأصلية من البيانات المضغوطة

③ Lossy compression is used for compressing audio, images, and video files in a way that humans do not perceive a significant difference, even if those files cannot perfectly restored to their original form.

يستخدم الضغط المفقود لضغط ملفات الصوت والصور والفيديو بطريقة لا يدرك فيها البشر فرقاً كبيراً، حتى لو تعذر استعادة هذه الملفات بشكل مثالي إلى شكلها الأصلي

③ Main Types of Lossless Compression الأنواع الرئيسية للضغط بدون فقدان

① Run-length encoding: ترميز طول التشغيل

A compression method that replaces sequences of the same consecutive symbols with a numerical value indicating the length of the sequence.

طريقة ضغط تستبدل تسلسلات نفس الرموز المتتالية المتطابقة بقيمة رقمية تشير إلى طول التسلسل

It is effective when there are many consecutive identical symbols.

وهي فعال عندما يكون هناك العديد من الرموز المتطابقة المتتالية

Example:

Before compression: "AAAAABBBAAAABBBBBBBBBAAAAAA" (25 characters)

AAAAA	BB	AAAA	BBBBBBBB	AAAAAA
5 of "A"	2 of "B"	4 of "A"	8 of "B"	6 of "A"

After compression: (A5B2A4B8A6) (10 characters)

The compression ratio is $(10/25 \times 100) = (40\%)$.

مثال: قبل الضغط: "AAAAABBBAAAABBBBBBBBBAAAAAA" (25 حرفاً)

بعد الضغط: (A5B2A4B8A6) (10¹⁷ أحرف)

نسبة الضغط هي $(10/25 \times 100) = (40\%)$

① Huffman coding: ترميز هوفمان

A compression method that assigns shorter bit sequences to characters with higher frequencies of occurrence, and longer bit sequences to those with lower frequencies.

طريقة ضغط تعين تسلسلات bit أقصر للأحرف ذات الترددات الأعلى، وتسلسلات bits أطول للأحرف ذات الترددات الأقل

Warm Up

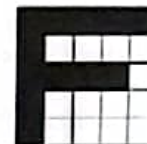
تحدى معلوماتك

Answer the following questions.

① What is the data size, in megabytes, of a 10-second uncompressed video at 30 fps, where each frame is a 24-bit full-color still image with a resolution of 500 x 200 pixels? For this question, assume that 1 KB = 1,000 B and 1 MB = 1,000 KB.

② Video [1] was converted into a compressed video file using a certain compression method, resulting in a file size of 30 MB. What is the compression ratio in this conversion? Round your answer to the nearest whole number and provide the answer as an integer.

② Consider how to represent an image using pixels. In the case of the diagram on the right, the 25 pixels in the 5 x 5 grid are read one by one from the top-left, row by row, moving to the right. If a pixel is black, write "B"; if it is white, write "W". This results in the sequence:



"BBBBBWWWWBBBBBWWWWWWBWWWW".

Next, by representing consecutive characters "B" or "W" of length n (where n is an integer of 2 or more) as "Bn" or "Wn", the sequence can be compressed to "B6W4B4WBW4BW4". Using the same method with another 5 x 5 grid, what is the alphabet letter represented by the following compressed data?

"B4WBW3B5WBW4BW4"

Explanation

الشرح

① The amount of data per frame is, $500 \times 200 \times 24 \text{ [bits]} = 2,400,000 \text{ [bits]}$

Since $1 \text{ B} = 8 \text{ bits}$, $2,400,000 \text{ [bits]} / 8 = 300,000 \text{ [B]}$

The amount of data of a 10-second video at 30 fps is as follows:

$300,000 \text{ [B]} \times 30 \text{ [fps]} \times 10 \text{ [seconds]} = 90,000,000 \text{ [B]}$

$1 \text{ KB} = 1,000 \text{ B}$, $1 \text{ MB} = 1,000 \text{ KB}$, therefore,

$90,000,000 \text{ [B]} / 1,000 / 1,000 = 90 \text{ [MB]} \text{ } 90 \text{ MB}$

② Compression ratio [%] =

Amount of data after compression / Original amount of data $\times 100$.

resulting in $30 / 90 \times 100 = 33.3 \text{ [%]} \text{ } 33\%$

2 Expanding the pre-compressed data "B4WBW3B5WBW4BW4" yields "BBBBWBWWBBBBBWBWWWWBWWWW".

If you fill in a 5×5 grid one pixel at a time from the top-left, row by row to the right, coloring black for "B" and white for "W", you will get the image shown on the right. Therefore, P



Al-Faez Exercises

1 Choose the correct answer from the following:

- The illusion of movement in videos is created by displaying a series of still images using the phenomenon.
 - afterimage
 - mirror
 - motion
 - pixel
- Each still image that makes up a video is called a
 - pixel
 - frame
 - clip
 - bit
- The unit used to measure frame rate is
 - Hz
 - Bps
 - fps
 - dpi
- Increasing the frame rate makes the video smoother and the data size
 - smaller
 - unchanged
 - compressed
 - larger
- The process of reducing data size while preserving content is called
 - conversion
 - compression
 - encoding
 - encryption
- The process of restoring compressed data to its original state is called
 - decoding
 - decompression
 - extraction
 - recovery
- A compression method that allows complete restoration of data is called
 - lossy
 - hybrid
 - reversible
 - lossless
- Lossy compression is mainly used for
 - text
 - programs
 - audio and video
 - spreadsheets
- Run-length encoding replaces sequences of identical symbols with
 - codes
 - numbers
 - bits
 - blocks
- Huffman coding assigns shorter bit sequences to characters that occur
 - rarely
 - equally
 - frequently
 - randomly

2 Put (✓) or (x) in front of each of the following sentences:

- Video creates the illusion of movement by showing a series of still images in succession. ()
- The afterimage phenomenon is unrelated to how videos appear to move. ()
- Each still image in a video is known as a frame. ()
- The term "fps" refers to frames per second. ()
- A lower frame rate produces smoother video playback. ()
- The higher the frame rate, the larger the video data size becomes. ()

- The amount of video data depends on image data size, frame rate, and time. ()
- Data compression increases the size of data while preserving content. ()
- Decompression is the process of restoring compressed data to its original state. ()
- The compression ratio shows how much data has been reduced. ()
- A higher compression ratio means less reduction in data size. ()
- Lossless compression allows perfect restoration of the original data. ()
- Lossy compression can fully restore the original file without loss. ()
- Lossless compression is often used for text or program files. ()
- Lossy compression is suitable for audio, image, and video data. ()
- In lossy compression, humans can easily notice major differences after compression. ()
- Run-length encoding replaces consecutive identical symbols with a value showing how many times they appear. ()
- Run-length encoding works best when data has few repeating symbols. ()
- Huffman coding assigns shorter bit sequences to more frequent characters. ()
- Huffman coding assigns longer bit sequences to characters that occur more often. ()

3 Complete the following with the suitable words in brackets:

(afterimage – data – frame – frame rate – fps)

- Video creates the illusion of movement by displaying a series of still images using the phenomenon.
- Each still image that composes a video is called a
- The number of frames displayed per second is known as the
- The unit used to express frame rate is
- Increasing the frame rate makes the video smoother but increases the size.

4 Write the scientific concept for each of the following:

- The electronic medium that creates the illusion of movement by displaying a series of still images in succession.
- Each still image that composes a video.
- The number of frames displayed per second in a video.
- The process of reducing the amount of data while preserving its content.
- The process of restoring compressed data to its original state.
- The extent to which data has been reduced compared to the original amount.
- A compression method that allows perfect restoration of the original data.
- A compression method in which the original data cannot be completely restored.
- A compression method that replaces sequences of identical symbols with a numerical value representing their length.
- A compression method that assigns shorter bit sequences to frequently occurring characters.

Information Design



1 Information Design تصميم البيانات

1 Information Design

The process of organizing and creatively expressing information according to its purpose, thereby ensuring that the intended message is correctly conveyed to the target audience.

تصميم البيانات: هي عملية تنظيم المعلومات والتعبير عنها بشكل إبداعي حسب الغرض منها، بما يضمن إيصال الرسالة المقصودة بشكل صحيح إلى الجمهور المستهدف

2 Information Design Methods طرق تصميم البيانات

[1] Abstraction: التجريد

Conveying the intended information simply from within a large amount of data.

نقل المعلومات المقصودة ببساطة من داخل كمية كبيرة من البيانات

• Pictogram: الرسم التصويري

A pictorial symbol designed for the purpose of conveying information without using words.

رمز تصويري مصمم لغرض نقل المعلومات دون استخدام الكلمات

It is used for information signs at stations and airports.

يتم استخدامه لإشارات المعلومات في المحطات والمطارات



Pictogram

• Icon: A representation of a program's content on a computer or smartphone depicted through images or illustrations.

الأيقونة: هي تمثيل لمحتوى البرنامج على جهاز كمبيوتر أو هاتف ذكي مصور من خلال الصور أو الرسوم التوضيحية



Icon

[2] Visualization:

Visually representing information to make it more understandable.

التصور: تمثيل المعلومات بصريا لجعلها أكثر قابلية للفهم

Examples: Tables, graphs, etc.

أمثلة: الجداول الرسوم البيانية، إلخ

[3] Structuring: الهيكلة

- Organizing and expressing information clearly by arranging it according to relationships, connections, levels, stages, order, etc.

تنظيم المعلومات والتعبير عنها بشكل واضح من خلال ترتيبها حسب العلاقات والارتباطات والمستويات والمراحل والترتيب وغيرها

Examples: Hierarchical menus on web pages, department store floor maps, etc.

قوائم هرمية على صفحات الويب، وخرائط أرضية المتاجر الكبرى، وما إلى ذلك

2 Design Techniques for Ease of Understanding

1 User interface (UI) واجهة المستخدم

A system for transferring information between humans and devices.

واجهة المستخدم: هي نظام لنقل المعلومات بين البشر والأجهزة.

Examples: Voice input, touch panel, keyboard, etc.

أمثلة: إدخال الصوت، الشاشة التي تعمل باللمس، لوحة المفاتيح، إلخ



2 CUI

A user interface where a device is operated by entering commands via a keyboard.

واجهة المستخدم حيث يتم تشغيل الجهاز عن طريق إدخال الأوامر عبر لوحة المفاتيح

3 GUI A user interface that allows users to issue commands in an intuitive and easy-to-understand way using icons and buttons.

واجهة مستخدم تتيح للمستخدمين إصدار الأوامر بطريقة بديهية وسهلة الفهم باستخدام الرموز والأزرار



2 User experience (UX) تجربة المستخدم

The experience or emotional impact that users gain from interacting with a product or service.

الخبرة أو التأثير العاطفي الذي يكتسبه المستخدمون من التفاعل مع منتج أو خدمة

3 Affordance Actions or operations that can be performed on an object.

الإمكانية: هي الإجراءات أو العمليات التي يمكن تنفيذها على كائن

4 Signifier Cues that prompt users to take action.

دلالة: إشارات تدفع المستخدمين إلى اتخاذ إجراء

5 Usability A measure used to indicate how easy and understandable it is for users.

قابلية الاستخدام: مقياس يستخدم للإشارة إلى مدى سهولة وقابلية الفهم من أجل المستخدمين

6 Accessibility إمكانية الوصول

The ease of access to information and services for a wide range of people.

سهولة الوصول إلى البيانات والخدمات لمجموعة واسعة من الأشخاص



7 Universal design: Design that is thoughtfully created with the intention that all people, regardless of age, language, nationality, or physical ability, can use it without difficulty.

التصميم الشامل: تصميم يتم إنشاؤه بشكل مدروس مع هدف أن جميع الناس بغض النظر عن العمر أو اللغة أو الجنسية أو القدرة الجسدية، يمكنهم استخدامه بدون صعوبة

3 Organizing and Classifying Information تنظيم وتصنيف المعلومات

• LATCH method: A principle for organizing information and presenting it in a way

that is easy for users to understand.

طريقة LATCH: مبدأ لتنظيم المعلومات وتقديمها بطريقة سهلة على المستخدمين فهمها

Information is organized and classified according to the following five criteria.

يتم تنظيم المعلومات وتصنيفها وفقاً للمعايير الخمسة التالية

❶ **Location:** Classification based on physical location.

الموقع: يعتمد التصنيف على الموقع الفعلي

❷ **Alphabet:** Classification based on alphabetical or syllabary order.

الأبجدية: يعتمد التصنيف على الترتيب الأبجدي أو اللفظي

❸ **Time:** A classification based on the sequence of events in terms of time.

الوقت: يعتمد التصنيف على تسلسل الأحداث من حيث الوقت

❹ **Category:** A classification based on the differences between things, used as a criterion to distinguish realms.

الفئة: يعتمد التصنيف على الفروقات بين الأشياء، ويُستخدم كمعيار لتمييز المجالات

❺ **Hierarchy:** Classification based on quantitative changes such as size, level, etc.

الهرمية: يعتمد التصنيف على التغيرات الكمية مثل الحجم، المستوى الدرجة.

Warm Up

تحدي معلوماتك

• Answer the following questions.

❶ Choose the most appropriate example of visualization as a method used in information design from the options **A** to **D** below, and answer using the letter.

A) Pictograms for each classroom were created to guide people around the school building.

B) A web page to introduce the school was created. The page was organized with menus for each hierarchy.

C) The survey results were compiled into tables and graphs.

D) Text summarizing multiple matters i presented in bullet points.

❷ Choose the term that best fits into the blanks [1] and [2] in the following sentences from the options **A** to **D** below, and answer using the letters.

Current computers widely use ([1]), which allows users to manipulate graphically displayed information, such as icons, with a mouse or their finger. On the other hand, early computers used ([2]), which was a method for conveying commands by inputting characters from a keyboard.

A) CUI B) GUI C) VUI D) NUI

❸ What is the term for a design that is thoughtfully created in advance to allow all individuals, regardless of nationality, gender, age, or physical ability, to use it without difficulty? Choose one from the options **A** to **D** below, and answer using the letter.

A) Usability B) Universal design C) Signifier D) User interface

Explanation

الشرح

❶ A) is an example of abstraction, B) of structuring,

C) of visualization, and

D) of structuring.

Therefore, C

❷ [1]: B [2]: A

❸ B



Al-Faez Exercises

❶ Choose the correct answer from the following:

1- The process of organizing and creatively expressing information to convey the intended message correctly is called

a. Visualization b. Affordance c. Structuring d. Information design

2- Conveying essential information simply from large data refers to

a. Abstraction b. Structuring c. Hierarchy d. Usability

3- A pictorial symbol used to convey information without words is a

a. Icon b. Graph c. Pictogram d. Menu

4- The method that visually represents information for better understanding is

a. Visualization b. Abstraction c. Accessibility d. Signifier

5- A user interface operated by typing commands is known as

a. GUI b. UI c. UX d. CUI

6- The experience or emotional impact users gain from interacting with a product is called:

a. Usability b. UX c. UI d. Accessibility

7- Cues that prompt users to take action are called

a. Affordance b. Signifier c. Usability d. Hierarchy

8- The ease of use and understanding of a product by users is termed

a. Accessibility b. Usability c. UX d. Affordance

9- Design that enables all people to use a product regardless of age or ability is

a. Universal design b. LATCH c. Visualization d. Structuring

10- The LATCH principle classifies information based on criteria including Location, Alphabet, Time, Category, and

a. Function b. Structure c. Hierarchy d. Purpose

❷ Put (✓) or (x) in front of each of the following sentences:

1- Information design ensures that messages are correctly conveyed to the target audience. ()

2- Abstraction is used to make information more complicated and detailed. ()

3- A pictogram uses pictures to convey information without words. ()

4- Icons are visual representations of programs on computers or smartphones. ()

- 5- Visualization involves expressing information through sound and touch. ()
- 6- Structuring helps organize information based on relationships, order, and levels. ()
- 7- The user interface (UI) connects humans and devices for information transfer. ()
- 8- GUI requires typing commands on a keyboard to operate a device. ()
- 9- CUI allows users to give commands using icons and buttons. ()
- 10- UX refers to the overall experience users have when interacting with a product or service. ()
- 11- Affordance describes the possible actions that can be performed on an object. ()
- 12- A signifier provides cues that guide users toward specific actions. ()
- 13- Usability measures how enjoyable a product looks to users. ()
- 14- Accessibility focuses on making information and services available to everyone. ()
- 15- The LATCH principle classifies information by Location, Alphabet, Time, Category, and Hierarchy. ()

3 Complete the following with the suitable words in brackets:

(data – purpose – words – understandable – smartphone)

- 1- Information design is the process of organizing and creatively expressing information according to its
- 2- Abstraction means conveying the intended information simply from within a large amount of
- 3- A pictogram is a pictorial symbol used to convey information without using
- 4- An icon represents a program's content on a computer or
- 5- Visualization represents information visually to make it more

4 Write the scientific concept for each of the following:

- 1- The process of organizing and creatively expressing information to convey the intended message correctly to the target audience.
- 2- Conveying the intended information simply from within a large amount of data.
- 3- A pictorial symbol designed to convey information without using words.
- 4- A representation of a program's content on a computer or smartphone depicted through images or illustrations.
- 5- Visually representing information to make it more understandable.
- 6- A system for transferring information between humans and devices.
- 7- The experience or emotional impact that users gain from interacting with a product or service.
- 8- Cues that prompt users to take action.
- 9- The ease of access to information and services for a wide range of people.
- 10- A principle for organizing information using Location, Alphabet, Time, Category, and Hierarchy.

Computer Configuration



1 The Five Major Components of a Computer

المكونات الخمسة الرئيسية للحاسوب



1 Hardware الأجهزة

Devices such as the main computer unit and peripheral devices.

مثل وحدة الكمبيوتر الرئيسية والأجهزة الطرفية



2 Peripheral devices الأجهزة الطرفية

Devices used by connecting them to a computer. أجهزة تُستخدم عن طريق توصيلها بجهاز كمبيوتر.

Examples

Keyboard	mouse	display	printer

3 The five major components of a computer المكونات الخمسة الرئيسية للكمبيوتر

A computer is comprised of the following five components:

يتكون الكمبيوتر من المكونات الخمسة التالية

1	2	3	4	5
control unit وحدة التحكم	arithmetic unit وحدة الحساب والمنطق	memory unit وحدة التخزين	the input unit وحدة الإدخال	output unit وحدة الإخراج

The control unit and arithmetic unit together are referred to as the (CPU (central processing unit)).



يطلق على (وحدة التحكم) و(وحدة الحساب والمنطق) معاً اسم، المعالج (Processor) أو وحدة المعالجة المركزية (UPC)

- Storage devices are divided into (main memory), which temporarily stores programs and data, وتنقسم أجهزة التخزين إلى (الذاكرة الرئيسية) والتي تقوم بتخزين البرامج والبيانات بشكل مؤقت
- and (secondary memory), which is used for long-term storage. و(الذاكرة الثانوية) والتي تستخدم للتخزين طويل المدى

Roles of the Five Major Components of a Computer.

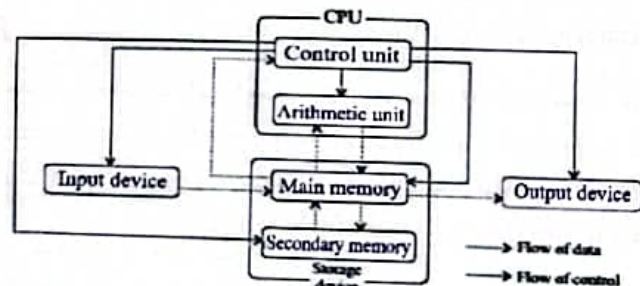
وظائف المكونات الخمسة الرئيسية للكمبيوتر

Five major components		Role	Example of major component
Control unit	CPU	Executes a computer's (instructions) and issues (commands) to each function.	CPU
Arithmetic unit		Performs (calculations)	
Storage device	Main memory device (Memory)	(Temporarily) stores programs, data, etc.	Main memory
	Secondary memory (Storage)	For (long-term) storage of programs and data.	Hard disk, SSD, USB memory
Input device		(Inputs) information from external sources.	Keyboard, mouse, scanner
Output device		(Outputs) information outside of the computer.	Display, printer

مثال على مكون رئيسي	وظيفة	خمس مكونات رئيسية
CPU(CU)	ينفذ التعليمات ويصدر الأوامر لكل وظيفة	وحدة التحكم
CPU(ALU)	يؤدي الحسابات	وحدة الحساب والمنطق
		جهاز التخزين
RAM	يخزن مؤقتًا البرامج والبيانات إلخ	وحدة الذاكرة الرئيسية (الذاكرة)
قرص صلب، SSD، ذاكرة USB	لتخزين البرامج والبيانات على المدى الطويل	ذاكرة التخزين الثانوية (التخزين)
لوحة المفاتيح، الفأرة، الماسح الضوئي	يُدخل البيانات من مصادر خارجية	جهاز الإدخال
شاشة، طابعة	يُخرج المعلومات خارج الكمبيوتر	جهاز الإخراج

Relationship of the Five Major Components of a Computer.

علاقة المكونات الخمسة الرئيسية للكمبيوتر



1 Interface واجهة

- A component that mediates the exchange of information. مكون يتوسط تبادل المعلومات
- It is used for connecting the main computer and peripheral devices. يتم استخدامه لتوصيل الكمبيوتر الرئيسي والأجهزة الطرفية

1 USB: The most widely used interface for computer peripheral devices.

USB: الواجهة الأكثر استخدامًا للأجهزة الطرفية للكمبيوتر

- Compatible with printers, keyboards, and external hard drives.

متوافق مع الطابعات ولوحات المفاتيح ومحركات الأقراص الصلبة الخارجية

2 HDMI: A communication standard that allows video, audio, and other data to be transmitted through a single cable.

HDMI: معيار اتصال يسمح بنقل الفيديو والصوت والبيانات الأخرى عبر كابل واحد

- Compatible with digital televisions and audio equipment.

متوافق مع الأجهزة مثل المحاور وأجهزة التوجيه

4 Ethernet: A communication standard used in wired LANs at home, the office, etc.

Ethernet: معيار اتصال يستخدم في الشبكات المحلية السلكية في المنزل والمكتب وما إلى ذلك

- Compatible with devices such as hubs and routers. متوافق مع الأجهزة مثل المحاور وأجهزة التوجيه

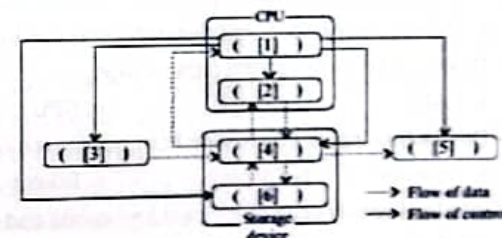
Warm Up

تحدى معلوماتك

Answer the following questions:

- 1 The following diagram represents the relationship between computer components. Choose the appropriate device name that best fits into the blanks [1] to [6] from the options A to F, and answer using the letters.

- A) Input device B) Output device
C) Control unit D) Arithmetic unit
E) Main memory device
F) Secondary memory



- 2 Choose all of the following options from A to H that are output devices, and answer using the letters.

- A) Memory B) Display C) SSD D) Mouse E) Keyboard
F) Printer G) Hard disk H) USB memory



Explanation

الشرح

- 1 Control unit, because the flow of control is directed towards all devices. **C**
 [2] Among the components of the CPU, [1] is the control unit; therefore, the arithmetic unit. **D**
 [3] The starting point of the data flow; therefore, the input device. **A**
 [4] Among storage devices, this is identified as the main memory because data flows directly into it from the input device. **E**
 [5] Marks the end of the data flow; therefore, an output device. **B**
 [6] Among storage devices, [4] is the main memory; therefore, the secondary memory. **F**
B, F



Al-Faez Exercises

1 Choose the correct answer from the following:

- The part of a computer that executes instructions and issues commands.
 a. Control unit b. Input device c. Output device d. Interface
- Devices such as keyboard, mouse, and printer belong to.
 a. Hardware b. Interface c. Peripheral devices d. Memory
- The unit that performs calculations.
 a. Arithmetic unit b. Control unit c. Memory unit d. Input unit
- The main components that together form the CPU.
 a. Input and output b. Control and arithmetic
 c. Memory and storage d. Keyboard and monitor
- Memory used for temporary data storage.
 a. Main memory b. Secondary memory c. USB d. SSD
- Device used for long-term data storage.
 a. RAM b. Mouse c. CPU d. Hard disk
- Device that inputs information from outside the computer.
 a. Scanner b. Display c. Printer d. CPU
- Interface widely used to connect keyboards and printers.
 a. HDMI b. USB c. Ethernet d. Wi-Fi
- Interface used to transmit video and audio through one cable.
 a. Ethernet b. USB c. HDMI d. SSD
- Communication standard used in wired LANs.
 a. Ethernet b. USB c. HDMI d. Wi-Fi

2 Put (✓) or (x) in front of each of the following sentences:

- The control unit and arithmetic unit together form the CPU. ()
- Peripheral devices include components like keyboard, mouse, and printer. ()
- The arithmetic unit is responsible for executing instructions and issuing commands. ()
- The main memory is used for long-term storage of data and programs. ()
- The control unit directs and coordinates all computer operations. ()
- The CPU is considered a type of output device. ()
- Storage devices are classified into main memory and secondary memory. ()
- The display and printer are examples of input devices. ()
- A USB interface is commonly used to connect external devices like printers and keyboards. ()
- HDMI is used to transmit both video and audio signals through a single cable. ()
- Ethernet is a standard used for wireless LAN connections. ()
- The memory unit temporarily stores data and programs. ()
- The arithmetic unit handles calculations inside the CPU. ()
- Peripheral devices are built directly into the main computer unit. ()
- The five major components of a computer include input and output units. ()

3 Complete the following with the suitable words in brackets:

(USB – HDMI – Control unit – Main memory – Arithmetic unit)

- A communication standard that transmits video and audio through a single cable is called
- The most widely used interface for connecting peripheral devices is
- The unit responsible for performing calculations is the
- The part of a computer that executes instructions and issues commands is the
- Memory that temporarily stores programs and data is called

4 Write the scientific concept for each of the following:

- The unit that executes instructions and coordinates all computer operations.
- The unit that performs all mathematical and logical calculations.
- The combination of the control unit and arithmetic unit.
- Memory used for temporarily storing programs and data.
- Memory used for long-term storage of data and programs.
- Devices that receive data and instructions from external sources.
- Devices that present information from the computer to the outside world.
- Devices like keyboard, mouse, and printer that are connected to the computer.
- A widely used interface for connecting peripheral devices like printers and keyboards.
- A communication standard that allows video, audio, and other data to be transmitted through a single cable.

Computer Software



1 Hardware and Software العتاد والبرمجيات

1 Hardware الأجهزة

Devices such as the main computer unit and peripheral devices.
أجهزة مثل وحدة الكمبيوتر الرئيسية والأجهزة الطرفية

Examples: CPU, memory, storage, etc.

أمثلة: CPU، الذاكرة، التخزين، إلخ

2 Software البرمجيات

Programs and data that operate on hardware. هي البرامج والبيانات التي تعمل على العتاد

1 System software برمجيات النظام

Software necessary for operating the hardware. البرامج اللازمة لتشغيل العتاد

2 Operating system (OS) برنامج النظام

A type of system software responsible for the basic functions of a computer.

نوع من برامج النظام مسؤول عن الوظائف الأساسية للكمبيوتر

An OS has management functions such as task management, memory management, and file management. يمتلك نظام التشغيل وظائف إدارة مثل إدارة المهام، إدارة الذاكرة، وإدارة الملفات

Examples: Windows, macOS, Android OS, etc.

أمثلة: Window، macOS، Android، إلخ



3 Application software برنامج التطبيق

Software that operates on top of system software.

البرامج التي تعمل فوق برنامج النظام

Also known as application software. يُعرف أيضًا باسم برنامج التطبيق

Examples: Word processing software, spreadsheet software, etc.

أمثلة: برامج معالجة النصوص، برامج الجداول الحسابية، إلخ



4 Device driver برنامج تشغيل الجهاز

A program that controls communication between a connected device and software on a computer. هو برنامج يتحكم في عملية الاتصال بين الجهاز المتصل والبرمجيات على جهاز كمبيوتر

Also known simply as a "driver." يُعرف أيضًا باسم "برنامج التشغيل"

Answer the following questions:

1 For the following statements A to D about an OS, mark "✓" if the statement is appropriate, and "x" if it is inappropriate.

- A) Software used to perform specific tasks.
- B) Smartphones do not come equipped with an OS.
- C) A type of system software essential for operating the hardware.
- D) Application software cannot run without system software.



Explanation

الشرح

- 1 A) An explanation about application software. Therefore, x
- B) Smartphones are equipped with an OS. For example, iPhones are equipped with iOS, while Android phones run on Android OS. Therefore, x
- C) An OS is a type of system software responsible for the basic functions of a computer. Therefore, ✓
- D) Application software is software that operates on top of system software. Therefore, ✓



Al-Faez Exercises

1 Choose the correct answer from the following:

- 1- Hardware refers to
a. Programs b. Data c. Devices d. Drivers
- 2- Software necessary for operating hardware is called
a. System software b. Application c. Memory d. Storage
- 3- Operating system (OS) manages
a. Files, tasks, memory b. Devices only c. Programs only d. Drivers only
- 4- Software that works on top of system software is
a. Driver b. Application software c. CPU d. Storage
- 5- A device driver controls communication between
a. Programs and users b. OS and CPU c. Memory and storage d. Devices and software

2 Put (✓) or (x) in front of each of the following sentences:

- 1- Hardware includes devices such as CPU, memory, and storage. ()
- 2- Software is made only of physical devices. ()
- 3- System software is necessary for operating the hardware. ()

- 4- Application software is responsible for managing tasks and memory. ()
- 5- Examples of operating systems include Windows, macOS, and Android OS. ()
- 6- Device drivers control communication between connected devices and software. ()
- 7- Application software runs directly on hardware without system software. ()
- 8- Memory management is one of the functions of an operating system. ()
- 9- A driver is another name for an operating system. ()
- 10- Spreadsheet software is an example of application software. ()

3 Complete the following with the suitable words in brackets:

(hardware – CPU – driver – data – system)

- 1- Drivers are also simply known as
- 2- Hardware includes devices such as, memory, and storage.
- 3- Software consists of programs and that operate on hardware.
- 4- System software is necessary for operating the
- 5- Operating system is a type of software.

4 Write the scientific concept for each of the following:

- 1- The physical devices of a computer, such as CPU, memory, and storage.
- 2- Programs and data that operate on computer hardware.
- 3- Software necessary for operating the hardware.
- 4- A type of system software responsible for managing tasks, memory, and files.
- 5- A program that controls communication between a connected device and software.

5 Complete the following with the suitable words:

- 1- Word processing and spreadsheet programs are examples of software.
- 2- A program that controls communication between a device and software is called a
- 3- Task management, memory management, and file management are functions of the:
- 4- Examples of operating systems include Windows, macOS, and
- 5- Software that operates on top of system software is called software.

Logic Circuits



1 Logic Circuits الدوائر المنطقية

1 Logical operations العمليات المنطقية

- Operations performed using combinations of the numbers 0 and 1.
العمليات المنطقية هي العمليات التي يتم إجراؤها باستخدام مجموعات من الأرقام 0 و 1
- In computers, "1" is processed as true and "0" as false.
في أجهزة الكمبيوتر، تتم معالجة الرقم "1" على أنه صحيح والرقم "0" على أنه خطأ

2 Logic circuit الدائرة المنطقية

- A circuit designed to perform logical operations. دائرة مصممة لإجراء العمليات المنطقية.

3 Truth table جدول الصواب

- A table that shows all possible combinations of inputs and outputs for a logic circuit.
جدول يوضح جميع التركيبات الممكنة للمدخلات والمخرجات لدائرة منطقية

4 AND gate (logical conjunction circuit)

بوابة AND دائرة الاقتان المنطقية

- A circuit that outputs 1 only when all inputs are 1.

دائرة تخرج 1 فقط عندما تكون جميع المدخلات 1

Input		Output
A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

5 OR gate (logical disjunction circuit)

بوابة OR دائرة الانفصال المنطقية

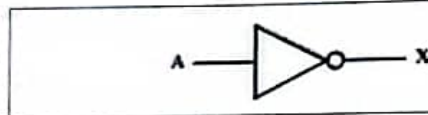
- A circuit that outputs 1 if at least one of the inputs is 1.

دائرة تخرج 1 إذا كان هناك على الأقل مدخل واحد 1

Input		Output
A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

6 NOT circuit (inverter circuit)

- A circuit that outputs the opposite result of the input.



بوابة NOT الدائرة العاكسة
دائرة تُخرج النتيجة المعاكسة للمدخل

Input		Output
A	X	
0		1
1		0

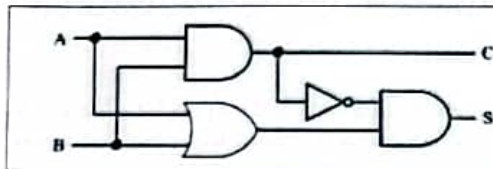
2 Half Adder Circuit and Full Adder Circuit

1 Half adder circuit

دائرة الجمع النصفي

- A circuit representing the addition of single-digit numbers, composed of AND, OR, and NOT gates.

دائرة تمثل جمع أعداد مكونة من رقم واحد، تتكون من بوابات AND OR و NOT



Input		Output	
A	B	C	S
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

2 Full adder circuit

دائرة الجمع الكامل

- A circuit that considers carry from the lower bit and carry to the higher bit.

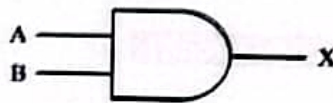
دائرة تأخذ في الاعتبار النقل من bit الأدنى والنقل إلى bit الأعلى

Warm Up

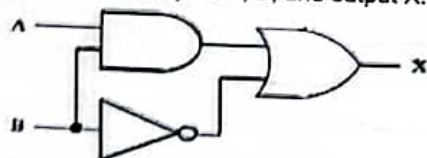
تحدى معلوماتك

Answer the following questions:

- Name the following logic circuit and create a truth table.



- A circuit was created by combining logic circuits as shown in the following diagram. In this case, create a truth table for inputs A, B, and output X.



Explanation

الشرح

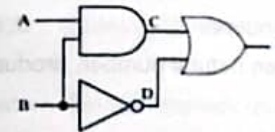
1 AND Circuit (logical conjunction circuit).

An AND circuit is a circuit that outputs 1 only when all inputs are 1.

Therefore, the truth table is as follows.

Input		Output
A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

2 Create and analyze the truth table for each circuit.



A	B	C	D	X
0	0	0	1	1
0	1	0	0	0
1	0	0	1	1
1	1	1	0	1

Therefore, the truth table is as follows.

Input		Output
A	B	X
0	0	1
0	1	0
1	0	1
1	1	1



Al-Faez Exercises

1 Put (✓) or (x) in front of each of the following sentences:

- Logical operations are performed using numbers 0 and 1. ()
- In computers, "0" is processed as true and "1" as false. ()
- A logic circuit is designed to perform arithmetic operations only. ()
- A truth table shows all possible combinations of inputs and outputs for a logic circuit. ()
- An AND gate outputs 1 if at least one input is 1. ()
- An OR gate outputs 1 only when all inputs are 1. ()
- A NOT circuit is also called an inverter circuit. ()
- A half adder circuit adds multi-digit numbers. ()
- A half adder is composed of AND, OR, and NOT gates. ()
- A full adder circuit ignores the carry from the lower bit. ()

2 Complete the following with the suitable words in brackets:

(truth table - 1, 1 - true, false - 0, and 1 - logic circuit)

- Logical operations are performed using combinations of the numbers
- In computers, "1" is processed as and "0" as
- A is a circuit designed to perform logical operations.
- A shows all possible combinations of inputs and outputs for a logic circuit.
- An AND gate outputs only when all inputs are

1 Choose the correct answer from the following:

- 15- Hexadecimal A4₍₁₆₎ in binary is
 a. 10100100 b. 10101001 c. 10010100 d. 11001010
- 2- Hexadecimal is a number system based on
 a. 8 b. 10 c. 12 d. 16
- 3- The standard that consolidates characters from different languages is
 a. ASCII b. Encoding c. Font d. Unicode
- 4- In binary subtraction, borrowing occurs when the is insufficient.
 a. subtrahend b. carry c. minuend d. sum
- 5- The smallest number which, when added to a given natural number, produces a carry to the next higher digit is called
 a. sum b. complement c. difference d. product

2 Put (✓) or (x) in front of each of the following sentences:

- 1- Sound is transmitted through the vibration of air. ()
- 2- The unit of frequency is measured in seconds. ()
- 3- One wave's propagation time is called its period. ()
- 4- Sampling means dividing the vertical axis (voltage) at regular intervals. ()
- 5- Quantization converts sampled wave heights to the nearest level on the vertical scale. ()

3 Complete the following with the suitable words in brackets:

(CPU (central processing unit) – Secondary memory - Peripheral devices
 - Output devices - Input devices)

- 1- The combination of the control unit and arithmetic unit is known as the
 2- Memory used for long-term storage, such as hard disks or SSDs, is called
 3- Devices that take information from external sources are called
 4- Devices that display or output information from the computer are called
 5- Devices like keyboard, mouse, and printer are called

4 Write the scientific concept for each of the following:

- 1- The process of converting digital data into analog data.
 2- The unit of information equal to 1,024 bytes.
 3- A number system that uses digits 0-9 and letters A-F.
 4- The arrangement of bits that represents actual information.
 5- The process of converting analog data into digital data.

1 Choose the correct answer from the following:

- 1- Conversion from hexadecimal to decimal requires first converting to
 a. Binary b. Octal c. Decimal d. Letters
- 2- Hexadecimal C6₍₁₆₎ in binary is
 a. 11000110 b. 10100110 c. 11100110 d. 10010110
- 3- The phenomenon caused by mismatched encoding and decoding is
 a. Font b. ASCII c. Character corruption d. UTF-8
- 4- In binary addition, a carry is generated when the sum reaches
 a. 1 b. 4 c. 3 d. 2
- 5- In decimal system, the complement used to represent negative numbers is
 a. 2's b. 9's c. 10's d. binary

2 Put (✓) or (x) in front of each of the following sentences:

- 1- At 8 bits per pixel, there are 128 levels from 0 to 127. ()
- 2- Encoding expresses quantized values in binary numbers. ()
- 3- Increasing resolution and gradation decreases image quality. ()
- 4- Higher resolution and gradation increase the data volume of an image. ()
- 5- Raster images may appear jagged when enlarged. ()

3 Complete the following with the suitable words in brackets:

(driver – application – OS – application – Android OS)

- 1- Word processing and spreadsheet programs are examples of software.
 2- A program that controls communication between a device and software is called a
 3- Task management, memory management, and file management are functions of the:
 4- Examples of operating systems include Windows, macOS, and
 5- Software that operates on top of system software is called software.

4 Write the scientific concept for each of the following:

- 1- The process of changing a binary number into decimal form.
 2- A system for transferring information between humans and devices.
 3- The process of changing a decimal number into binary form.
 4- Data represented using continuous quantities such as mass, time, or temperature.
 5- Data represented numerically by segmenting values at regular intervals.

1 Choose the correct answer from the following:

- Decimal number 198 equals hexadecimal
a. 7E b. A4 c. 9A d. C6
- Required elements to display characters on screen or printer are
a. Font and code b. Encoding and decoding
c. ASCII and Unicode d. UTF-16
- Each hexadecimal digit represents
a. 2 bits b. 3 bits c. 4 bits d. 5 bits
- Addition and subtraction in binary numbers are performed
a. randomly b. digit by digit
c. in reverse d. by grouping
- The process of inverting 0s to 1s and 1s to 0s, then adding 1 is used to calculate
a. 9's complement b. subtraction c. decimal sum d. 2's complement

2 Put (✓) or (x) in front of each of the following sentences:

- The afterimage phenomenon is unrelated to how videos appear to move. ()
- Each still image in a video is known as a frame. ()
- The term "fps" refers to frames per second. ()
- A lower frame rate produces smoother video playback. ()
- The higher the frame rate, the larger the video data size becomes. ()

3 Complete the following with the suitable words in brackets:

(single-digit - carry, carry - 1, 1 - inverter, opposite - AND, OR)

- An OR gate outputs if at least one of the inputs is
- A NOT circuit, also called an circuit, outputs the result of the input.
- A half adder circuit represents the addition of numbers.
- A half adder is composed of,, and NOT gates.
- A full adder circuit considers from the lower bit and to the higher bit.

4 Write the scientific concept for each of the following:

- The method of representing numbers using two digits, 0 and 1.
- The subscript (16) placed at the bottom right of a number.
- The system of representing numbers using ten digits from 0 to 9.
- A group of four binary digits representing one hexadecimal digit.
- The system of representing numbers using only 0 and 1.

1 Choose the correct answer from the following:

- Secondary information comes from
a. research b. experiments
c. third parties d. surveys
- Cross-checking means comparing information to ensure
a. beauty b. privacy
c. speed d. accuracy
- Using a smartphone while walking causes
a. focus b. safety
c. accidents d. rest
- Cybercrime means using computers or networks for activities.
a. criminal b. business
c. social d. artistic
- Limiting copyright to allow use without permission applies in cases.
a. illegal b. exceptional
c. regular d. private

2 Put (✓) or (x) in front of each of the following sentences:

- Social media has no influence on communication between individuals. ()
- Excessive internet use that harms daily life is known as internet addiction. ()
- Logical operations are performed using numbers 0 and 1. ()
- In computers, "0" is processed as true and "1" as false. ()
- Mass communication means sending information to a few individuals only. ()

3 Complete the following with the suitable words in brackets:

(CPU (central processing unit) – Secondary memory – carry, carry – Four Basic Items)

- Name, address, date of birth, and gender are known as the
- A full adder circuit considers from the lower bit and to the higher bit.
- A policy that defines how companies manage personal data is called a
- The combination of the control unit and arithmetic unit is known as the
- Memory used for long-term storage, such as hard disks or SSDs, is called

4 Write the scientific concept for each of the following:

- 1- The unit that performs all mathematical and logical calculations.
- 2- The device invented by Bell in 1876 that allows voice communication over long distances.
- 3- The physical devices of a computer, such as CPU, memory, and storage.
- 4- Programs and data that operate on computer hardware.
- 5- The first experimental broadcast conducted in 1906 in the United States.



Al-Faez Exercises

Test (2)

1 Choose the correct answer from the following:

1. Media are tools for
 - a. eating
 - b. traveling
 - c. conveying information
 - d. storing energy
2. Recording media are used for
 - a. talking
 - b. recording
 - c. painting
 - d. speaking
3. Identity theft involves stealing someone's
 - a. ideas
 - b. IDs or passwords
 - c. photos
 - d. comments
4. Leakage of personal information means revealing data to
 - a. friends
 - b. teachers
 - c. third parties
 - d. family
5. Reproduction for private use is an example of a copyright
 - a. violation
 - b. limitation
 - c. license
 - d. exception

2 Put (✓) or (x) in front of each of the following sentences:

- 1- A logic circuit is designed to perform arithmetic operations only. ()
- 2- A truth table shows all possible combinations of inputs and outputs for a logic circuit. ()
- 3- An AND gate outputs 1 if at least one input is 1. ()
- 4- An OR gate outputs 1 only when all inputs are 1. ()
- 5- Newspapers and magazines are examples of mass communication. ()

5 Complete the following with the suitable words in brackets:

- (copyright – true, false – information society – precedents – Input devices)
1. Information ethics refers to the foundational concepts and attitudes necessary for proper behavior in the
 2. Sharing photos or videos without permission violates
 3. Privacy and image rights are recognized through court
 4. Devices that take information from external sources are called
 5. In computers, "1" is processed as and "0" as

4 Write the scientific concept for each of the following:

1. The right of an individual to protect personal information they do not want others to know.
2. A document or statement that explains how a company manages personal data.
- 3- Software necessary for operating the hardware.
- 4- A program that controls communication between a connected device and software.
- 5- The combination of the control unit and arithmetic unit.



Al-Faez Exercises

Test (3)

1 Choose the correct answer from the following:

1. Media literacy is the ability to
 - a. read books
 - b. interpret media
 - c. play music
 - d. design posters
2. Data are represented using
 - a. numbers
 - b. books
 - c. colors
 - d. signals
3. Disinformation and rumors can lead to
 - a. truth
 - b. silence
 - c. safety
 - d. confusion
4. Information ethics involves the foundational necessary for proper behavior in the information society.
 - a. laws
 - b. devices
 - c. concepts
 - d. games
5. Using part of another's work in your own is called
 - a. quotation
 - b. citation
 - c. adaptation
 - d. translation

Final tests

Put (✓) or (x) in front of each of the following sentences:

- 1- A NOT circuit is also called an inverter circuit. ()
- 2- A half adder circuit adds multi-digit numbers. ()
- 3- The internet was originally created for entertainment purposes. ()
- 4- The development of communication methods shows human progress in sharing information. ()
- 5- Asynchronous communication means both parties must be present at the same moment. ()

Complete the following with the suitable words in brackets:

(spread – laws – logic circuit – Output devices – application)

1. Information ethics applies regardless of the presence or absence of
2. Information on the internet is easily and tends not to disappear.
3. Devices that display or output information from the computer are called
4. Word processing and spreadsheet programs are examples of software.
5. A is a circuit designed to perform logical operations.

Write the scientific concept for each of the following:

- 1- The process of receiving and exchanging information between people.
- 2- The right preventing others from using one's image or appearance without permission.
- 3- The right protecting the economic interests of famous people in their likeness.
- 4- A type of system software responsible for managing tasks, memory, and files.
- 5- The communication type in which the sender and receiver are directly face-to-face.



Al-Faez Exercises

Test (4)

Choose the correct answer from the following:

1. Information holds
a. form
b. time
c. weight
d. meaning
2. Information is used for
a. decoration
b. games
c. decision-making
d. translation
3. Information ethics applies regardless of the presence or absence of
a. rules
b. media
c. rights
d. laws

4. Internet information spreads easily and tends
a. not to disappear
b. to increase
c. to disappear
d. to stop
5. In quotation, your own work must be
a. subordinate
b. shorter
c. primary
d. secondary

Put (✓) or (x) in front of each of the following sentences:

- 1- A half adder is composed of AND, OR, and NOT gates. ()
- 2- A full adder circuit ignores the carry from the lower bit. ()
- 3- In ancient times, people used signal fires and drums to convey information. ()
- 4- Writing was used for communication before signal fires. ()
- 5- Conversations and presentations are examples of indirect communication. ()

Complete the following with the suitable words in brackets:

(1, 1 - truth table - privacy - online bullying - Peripheral devices)

1. Revealing another person's personal information online violates their
2. Posting insulting comments about others is a form of
3. Devices like keyboard, mouse, and printer are called
4. A shows all possible combinations of inputs and outputs for a logic circuit.
5. An AND gate outputs only when all inputs are

Write the scientific concept for each of the following:

1. A circuit designed to perform logical operations.
2. A table that shows all possible combinations of inputs and outputs for a logic circuit.
3. The type of communication where one sender interacts with one receiver.
4. A method that requires prior consent before collecting user data.
5. Numbers such as passport, national ID, or driver's license numbers used to identify individuals.



Al-Faez Exercises

Test (5)

Choose the correct answer from the following:

1. Information has no
a. form
b. color
c. limit
d. owner

Final tests

4 Write the scientific concept for each of the following:

1. A circuit that outputs 1 only when all inputs are 1.
2. The foundational concepts and attitudes necessary for proper behavior in the information society.
3. The embedding of latitude and longitude data in photos and videos taken with smartphones.
4. A circuit representing the addition of single-digit numbers, composed of AND, OR, and NOT gates.
5. A tool for sending and receiving text-based messages over the internet.



Al-Faez Exercises

Test (7)

1 Choose the correct answer from the following:

1. Information spreads through
a. games
c. machines
b. schools
d. mass media
2. Knowledge is information that has been
a. analyzed
c. printed
b. deleted
d. moved
3. Disinformation refers to information spread intentionally.
a. true
c. false
b. useful
d. secret
4. Social media are online platforms that allow individuals to
a. sleep
c. trade
b. connect
d. read
5. The unit that performs calculations.
a. Arithmetic unit
c. Memory unit
b. Control unit
d. Input unit

2 Put (✓) or (x) in front of each of the following sentences:

- 1- The sampling theorem states that the sampling frequency must exceed twice the highest frequency in the original waveform. ()
- 2- It is difficult to combine various types of media in digital form. ()
- 3- Binary represents numbers using only two digits: 0 and 1. ()
- 4- In computers, only numerical information is represented in binary form. ()
- 5- Lower sampling frequency and bit depth produce better sound quality. ()

Al-Faez

First Year Secondary

Final tests

3 Complete the following with the suitable words in brackets:

(Hardware – credit – Software – Protection – application)

- 1- The "BY" mark means giving to the creator.
- 2- Copyright aims to contribute to cultural development by ensuring the fair use of works and the of rights.
- 3- Software that operates on top of system software is called software.
- 4- The physical devices of a computer, such as CPU, memory, and storage.
- 5- Programs and data that operate on computer hardware.

4 Write the scientific concept for each of the following:

1. The process of converting digital data into analog data.
2. A situation where internet use becomes excessive and interferes with daily life.
3. The act of sharing another person's images or videos without permission, violating their rights.
4. A phenomenon transmitted through the vibration of air.
5. The method of representing numbers using two digits, 0 and 1.



Al-Faez Exercises

Test (8)

1 Choose the correct answer from the following:

1. Primary information is obtained through
a. reading
c. copying
b. guessing
d. experience
2. The unit used to measure frequency is
a. Volt
c. Hertz
b. Bit
d. Byte
3. Spending too much time online to the point it affects daily life is called
a. addiction
c. privacy
b. learning
d. sharing
4. The main components that together form the CPU.
a. Input and output
c. Memory and storage
b. Control and arithmetic
d. Keyboard and monitor
5. After writing was developed, messages were written on
a. Metal
c. Paper
b. Stone
d. Wood

Final tests

2 Put (✓) or (x) in front of each of the following sentences:

1. Cloud storage is an example of expression media. ()
2. Digital data cannot be edited once stored. ()
3. Leakage of personal information means keeping private data safe. ()
4. Analog quantities include measurements such as mass, time, and temperature. ()
5. Sound is transmitted through the vibration of air. ()

3 Complete the following with the suitable words in brackets:

(exceptions – carry – Frequency – source – 1, 1)

- 1- Reproduction for private use and reproduction within educational institutions are examples of copyright
- 2- The of the quoted material must always be clearly specified.
- 3- An OR gate outputs if at least one of the inputs is
- 4- A full adder circuit considers from the lower bit and to the higher bit.
- 5- The number of waves contained in one second is called

4 Write the scientific concept for each of the following:

1. False or baseless information intentionally spread to mislead people.
2. The disclosure of confidential personal data to unauthorized individuals or groups.
3. Software necessary for operating the hardware.
4. The process of dividing the time axis into intervals and extracting wave heights.
5. A type of system software responsible for managing tasks, memory, and files.



Al-Faez Exercises

Test (9)

1 Choose the correct answer from the following:

- 1- Memory used for temporary data storage.
 - a. Main memory
 - b. Secondary memory
 - c. USB
 - d. SSD
- 2- Device used for long-term data storage.
 - a. RAM
 - b. Mouse
 - c. CPU
 - d. Hard disk

3- Basic information in ancient times was conveyed by

- a. Writing
- b. Radio
- c. Electricity
- d. Signal fires

4- Drums were used in ancient times for

- a. Music
- b. Celebration
- c. communication
- d. Transportation

5- The unit used to measure frequency is

- a. Volt
- b. Bit
- c. Hertz
- d. Byte

2 Put (✓) or (x) in front of each of the following sentences:

1. Information has a physical form like objects. ()
2. Information provides meaning or value for the recipient. ()
3. Posting false rumors online helps maintain a safe digital environment. ()
4. Respecting others' privacy and rights is part of information ethics. ()
5. Audio and images can be represented in binary form in computers. ()

3 Complete the following with the suitable words in brackets:

(inverter, opposite – necessity – quotation – Encoding – Analog)

- 1- Quotation must be done only when there is a real for it.
- 2- Quoted material must be clearly identifiable by enclosing it in marks.
- 3- A NOT circuit, also called an circuit, outputs the result of the input.
- 4- Quantities that can be measured continuously and with fine precision are called:
- 5- The process of expressing quantized values in binary form is called

4 Write the scientific concept for each of the following:

1. The use of computers and networks to commit illegal acts.
2. The act of pretending to be another person or organization to steal IDs or passwords.
3. A program that controls communication between a connected device and software.
4. The process of converting analog data into digital data.
5. The process of converting sampled wave heights to the nearest level on the vertical scale.



1 Choose the correct answer from the following:

- Device that inputs information from outside the computer.
 - Scanner
 - Display
 - Printer
 - CPU
- Interface widely used to connect keyboards and printers.
 - HDMI
 - USB
 - Ethernet
 - Wi-Fi
- Hardware refers to
 - Programs
 - Data
 - Devices
 - Drivers
- Software necessary for operating hardware is called
 - System software
 - Application
 - Memory
 - Storage
- The first computer network experiment supported by the U.S. Department of Defense was called
 - Internet
 - Telegraph
 - Wi-Fi
 - ARPANET

2 Put (✓) or (x) in front of each of the following sentences:

- Information can be completely erased after creation. ()
- Persistence means information continues to exist once created. ()
- Responsible online behavior helps create a healthy information society. ()
- Information ethics provides the concepts and attitudes needed for correct behavior in the information society. ()
- Monaural playback uses two different signals. ()

3 Complete the following with the suitable words in brackets:

(per second - Digital data - human life - Image Rights - single-digit)

- Data may be shared without consent when necessary for the protection of or property.
- Data amount is calculated as sampling frequency $\times$ Quantization bit depth $\times$ Number of channels.
- Preventing others from using one's face or appearance without permission is part of:
- A half adder circuit represents the addition of numbers.
- Data represented in digital form is referred to as

4 Write the scientific concept for each of the following:

- The number of frames displayed per second in a video.
- A phenomenon transmitted through the vibration of air.
- The method used to digitize analog audio data by converting it into binary code.
- The electronic medium that creates the illusion of movement by displaying a series of still images in succession.
- The process of converting the brightness of each pixel into numerical levels.



1 Choose the correct answer from the following:

- Interface used to transmit video and audio through one cable.
 - Ethernet
 - USB
 - HDMI
 - SSD
- Communication standard used in wired LANs.
 - Ethernet
 - USB
 - HDMI
 - Wi-Fi
- Operating system (OS) manages
 - Files, tasks, memory
 - Devices only
 - Programs only
 - Drivers only
- Software that works on top of system software is
 - Driver
 - Application software
 - CPU
 - Storage
- The first experimental radio broadcast was conducted in
 - 1906
 - 1928
 - 1837
 - 1876

2 Put (✓) or (x) in front of each of the following sentences:

- Propagation makes information difficult to spread. ()
- Mass media such as newspapers and TV help spread information. ()
- The application of information ethics depends on the existence of laws. ()
- Information on the internet spreads easily and rarely disappears completely. ()
- The three primary colors of light are cyan, magenta, and yellow. ()

3 Complete the following with the suitable words in brackets:

(Right to Privacy – same – laws – AND, OR – altered)

1. Sharing personal information is allowed when it is based on and regulations.
2. A half adder is composed of,, and NOT gates.
3. The right to keep private information secret is called the
4. Quoted material must not be or changed in any way.
5. The "SA" mark means publishing adaptations under the license terms as the original.

4 Write the scientific concept for each of the following:

1. The process of reducing the amount of data while preserving its content.
2. The process of organizing and creatively expressing information to convey the intended message correctly to the target audience.
3. The process of restoring compressed data to its original state.
4. The smallest unit that composes an image and forms its structure.
5. The process of dividing an image into pixels and extracting representative brightness.



Al-Faez Exercises

Test (12)

1 Choose the correct answer from the following:

- 1- A device driver controls communication between
 - a. Programs and users
 - b. OS and CPU
 - c. Memory and storage
 - d. Devices and software
- 2- Examples of mass communication include
 - a. Letters
 - b. Radio and television
 - c. Telephone
 - d. Morse code
- 3- The movable-type printing press was invented by
 - a. Bell
 - b. Gutenberg
 - c. Morse
 - d. Marconi
- 4- The term "BBS" stands for
 - a. Basic Blogging System
 - b. Bulletin Board System
 - c. Browser-Based Service
 - d. Binary Broadcasting Software

5- The main function of a BBS is to allow users to

- a. make voice calls
- b. design websites
- c. post and read messages
- d. edit videos

2 Put (✓) or (x) in front of each of the following sentences:

1. Knowledge is formed when information is analyzed and systematized. ()
2. Primary information is obtained from other people's experiences. ()
3. Once information is deleted from the internet, it completely vanishes forever. ()
4. Sharing copyrighted materials without permission is a violation of others' rights. ()
5. Mixing the three primary colors of light increases brightness and moves toward white. ()

3 Complete the following with the suitable words in brackets:

(Encoding – Publicity Rights – Numbers – Secondary memory – CPU (central processing unit))

1. The right protecting the economic interests of celebrities is called
2. such as passport or national ID numbers are called Personal Identification Codes.
3. The combination of the control unit and arithmetic unit is known as the
4. Memory used for long-term storage, such as hard disks or SSDs, is called
5. represents a string with character codes, while the opposite process is decoding.

4 Write the scientific concept for each of the following:

1. The smallest unit that composes an image and forms its structure.
2. The degree of fineness of pixels during the sampling process, measured in dpi.
3. A compression method that assigns shorter bit sequences to frequently occurring characters.
4. Conveying the intended information simply from within a large amount of data.
5. A pictorial symbol designed to convey information without using words.



1 Choose the correct answer from the following:

- 1- The "BY" mark in Creative Commons stands for
 - a. business use
 - b. by creator
 - c. basic rights
 - d. credit to creator
- 2- The "NC" mark means the work cannot be used for purposes.
 - a. commercial
 - b. private
 - c. legal
 - d. public
- 3- Mobile phone service began in the United States in
 - a. 1837
 - b. 1895
 - c. 1969
 - d. 1946
- 4- Mass communication means sending information to
 - a. One person
 - b. A small group
 - c. A large number of people
 - d. Machines
- 5- The abbreviations "To", "CC", and "BCC" are commonly used in
 - a. Blogs
 - b. Video calls
 - c. Social media
 - d. Email communication

2 Put (✓) or (x) in front of each of the following sentences:

1. Experimental reports and survey results are examples of primary information. ()
2. Secondary information is obtained directly through personal research. ()
3. Subtractive color mixing is used in color printers. ()
4. Publishing someone's personal data without consent respects their privacy. ()
5. Online bullying includes posting insulting or defamatory comments about others. ()

3 Complete the following with the suitable words in brackets:

(2 – compliance - Output devices - Peripheral devices - Prior Approval System)

1. Companies must obtain a license from the Personal Data Protection Center to ensure with the law.
2. The system where data is not collected unless prior consent is given is called the
3. Devices that display or output information from the computer are called

4. Devices like keyboard, mouse, and printer are called
5. A carry is generated in binary addition when the sum reaches

4 Write the scientific concept for each of the following:

- 1- A representation of a program's content on a computer or smartphone depicted through images or illustrations.
- 2- The degree of fineness of pixels during the sampling process, measured in dpi.
- 3- A compression method in which the original data cannot be completely restored.
- 4- Visually representing information to make it more understandable.
- 5- The smallest unit that composes an image and forms its structure.



1 Choose the correct answer from the following:

- 1- The "ND" mark requires no of the original work.
 - a. copy
 - b. sale
 - c. use
 - d. change
- 2- The "SA" mark requires adaptations to use the license terms.
 - a. same
 - b. new
 - c. limited
 - d. old
- 3- The inventor of the telephone was
 - a. Bell
 - b. Morse
 - c. Marconi
 - d. Edison
- 4- The wireless telegraph was invented by
 - a. Morse
 - b. Marconi
 - c. Bell
 - d. Gutenberg
- 5- Email allows users to send messages to several recipients using
 - a. Attachments
 - b. Spam filters
 - c. Firewalls
 - d. Broadcast capability

2 Put (✓) or (x) in front of each of the following sentences:

1. Cross-checking helps ensure accuracy and reliability of information. ()
2. Media are tools for storing food and materials. ()
3. Usability measures how enjoyable a product looks to users. ()
4. Geotagging in photos can reveal the location of the photographer. ()

Al-Faez Exercises

1 Choose the correct answer from the following:

- The "BY" mark in Creative Commons stands for
a. business use
b. by creator
c. basic rights
d. credit to creator
- The "NC" mark means the work cannot be used for purposes.
a. commercial
b. private
c. legal
d. public
- Mobile phone service began in the United States in
a. 1837
b. 1895
c. 1969
d. 1946
- Mass communication means sending information to
a. One person
b. A small group
c. A large number of people
d. Machines
- The abbreviations "To", "CC", and "BCC" are commonly used in
a. Blogs
b. Video calls
c. Social media
d. Email communication

2 Put (✓) or (x) in front of each of the following sentences:

- Experimental reports and survey results are examples of primary information. ()
- Secondary information is obtained directly through personal research. ()
- Subtractive color mixing is used in color printers. ()
- Publishing someone's personal data without consent respects their privacy. ()
- Online bullying includes posting insulting or defamatory comments about others. ()

3 Complete the following with the suitable words in brackets:

(2 – compliance - Output devices - Peripheral devices - Prior Approval System)

- Companies must obtain a license from the Personal Data Protection Center to ensure with the law.
- The system where data is not collected unless prior consent is given is called the
- Devices that display or output information from the computer are called

- Devices like keyboard, mouse, and printer are called
- A carry is generated in binary addition when the sum reaches

4 Write the scientific concept for each of the following:

- A representation of a program's content on a computer or smartphone depicted through images or illustrations.
- The degree of fineness of pixels during the sampling process, measured in dpi.
- A compression method in which the original data cannot be completely restored.
- Visually representing information to make it more understandable.
- The smallest unit that composes an image and forms its structure.

Al-Faez Exercises

Test (14)

1 Choose the correct answer from the following:

- The "ND" mark requires no of the original work.
a. copy
b. sale
c. use
d. change
- The "SA" mark requires adaptations to use the license terms.
a. same
b. new
c. limited
d. old
- The inventor of the telephone was
a. Bell
b. Morse
c. Marconi
d. Edison
- The wireless telegraph was invented by
a. Morse
b. Marconi
c. Bell
d. Gutenberg
- Email allows users to send messages to several recipients using
a. Attachments
b. Spam filters
c. Firewalls
d. Broadcast capability

2 Put (✓) or (x) in front of each of the following sentences:

- Cross-checking helps ensure accuracy and reliability of information. ()
- Media are tools for storing food and materials. ()
- Usability measures how enjoyable a product looks to users. ()
- Geotagging in photos can reveal the location of the photographer. ()

5. Removing geotags from photos prevents others from knowing your location. ()

3 Complete the following with the suitable words in brackets:

(0, and 1 – Personal Information – law – single-digit – Input devices)

- Information like race, creed, or medical history is known as Special Care-Required
- The that regulates the handling of personal information is called the Act on the Protection of Personal Information.
- Devices that take information from external sources are called
- A half adder circuit represents the addition of numbers.
- Logical operations are performed using combinations of the numbers

4 Write the scientific concept for each of the following:

- The value level representing the intensity of color per pixel.
- A compression method that replaces sequences of identical symbols with a numerical value representing their length.
- Visually representing information to make it more understandable.
- The process of expressing quantized values in binary numbers (0 and 1).
- A system for transferring information between humans and devices.



Al-Faez Exercises

Test (15)

1 Choose the correct answer from the following:

- All Creative Commons marks are used to guide of works.
 - usage
 - destruction
 - creation
 - translation
- Copyright aims to promote cultural development through fair use and
 - privacy
 - sharing
 - protection of rights
 - quotation
- The Morse telegraph was invented by
 - Bell
 - Marconi
 - Morse
 - Gutenberg
- The telephone was invented in
 - 1876
 - 1837
 - 1895
 - 1946

- 5- The main purpose of Internet communication tools is to

- play games
- store files
- share and exchange information
- design websites

2 Put (✓) or (x) in front of each of the following sentences:

- Expression media include text, images, and audio. ()
- Transmission media are used to send and communicate information. ()
- Usability measures how enjoyable a product looks to users. ()
- Disinformation refers to intentionally spreading false or baseless information. ()
- Social media platforms allow people to connect and share content online. ()

3 Complete the following with the suitable words in brackets:

(NOT – directly – consent – Control unit – Main memory)

- Personal information refers to any data related to a natural person who can be identified or indirectly.
- Personal information cannot be provided to a third party without the individual's
- The unit that executes instructions and coordinates all computer operations.
- Memory used for temporarily storing programs and data.
- A half adder is composed of AND, OR and gates.

4 Write the scientific concept for each of the following:

- The method of representing colors by combining red, green, and blue light.
- A compression method that assigns shorter bit sequences to frequently occurring characters.
- A representation of a program's content on a computer or smartphone depicted through images or illustrations.
- A system for transferring information between humans and devices.
- A number system that uses digits 0-9 and letters A-F.

Unit One - Lesson 1

- (1) c (2) d (3) c (4) b (5) b (6) a (7) d (8) c
(9) a (10) b (11) c (12) d (13) b (14) a (15) d
● (1) ✓ (2) ✓ (3) ✓ (4) x (5) ✓ (6) ✓ (7) x
(8) ✓ (9) x (10) ✓ (11) ✓ (12) x (13) ✓ (14) ✓
(15) x (16) ✓ (17) x (18) ✓ (19) ✓ (20) x
● (1) Data (2) meaning (3) decision-making
(4) form (5) erased
● (1) Data (2) Information (3) Knowledge
(4) Persistence (5) Reproducibility
(6) Propagation (7) Primary information
(8) Secondary information
(9) Cross-checking (10) Media literacy
● (1) copied (2) convey
(3) newspapers and television
(4) Systematized (5) experience (6) primary
(7) third (8) cross-checking (9) conveying
(10) interpret

Unit One - Lesson 2

- (1) c (2) a (3) b (4) c (5) b (6) c (7) d (8) a
(9) d (10) a (11) d (12) c (13) c (14) b (15) a
● (1) ✓ (2) ✓ (3) ✓ (4) x (5) x (6) ✓ (7) ✓
(8) ✓ (9) x (10) ✓ (11) x (12) ✓ (13) x (14) ✓
(15) ✓ (16) ✓ (17) ✓ (18) ✓ (19) x (20) ✓
● (1) accidents (2) cybercrime
(3) identity theft (4) personal information
(5) information ethics
● (1) Information ethics
(2) Internet addiction
(3) Copyright infringement (4) Geotagging
(5) Disinformation (6) Cybercrime
(7) Identity theft
(8) Leakage of personal information
(9) Social media (10) Online bullying

- (1) information society (2) laws
(3) spread (4) copyright (5) privacy
(6) online bullying
(7) latitude, longitude (8) disinformation

Unit Two - Lesson 1

- (1) b (2) c (3) d (4) c (5) c (6) b (7) a (8) b
(9) c (10) a (11) b (12) b (13) b (14) a (15) d
● (1) ✓ (2) ✓ (3) ✓ (4) (5) x (6) x (7) ✓ (8) ✓
(9) ✓ (10) x (11) ✓ (12) ✓ (13) ✓ (14) x
(15) ✓ (16) ✓ (17) ✓ (18) x (19) ✓ (20) ✓
● (1) directly (2) Four Basic Items
(3) precedents (4) Privacy Policy
(5) consent
● (1) Right to Privacy (2) Image Rights
(3) Publicity Rights (4) Privacy Policy
(5) Prior Approval System
(6) Personal Information
(7) Four Basic Items
(8) Personal Identification Codes
(9) Special Care-Required Personal Information
(10) Act on the Protection of Personal Information
● (1) human life (2) laws
(3) Right to Privacy
(4) Image Rights (5) Publicity Rights
(6) compliance
(7) Prior Approval System
(8) Personal Identification Codes

Unit Two - Lesson 2

- (1) d (2) a (3) d (4) a (5) b (6) c (7) d (8) a
(9) b (10) c (11) b (12) b (13) b (14) c (15) c
● (1) ✓ (2) x (3) ✓ (4) x (5) ✓ (6) ✓ (7) x
(8) ✓ (9) ✓ (10) x (11) ✓ (12) x (13) ✓ (14) ✓
(15) x (16) ✓ (17) ✓ (18) x (19) ✓ (20) ✓

- (1) logos (2) arts (3) Non-Formality
(4) 50 (5) inventions
● (1) Intellectual Property Rights
(2) Industrial Property Rights
(3) Formality Principle
(4) Egypt Patent Office
(5) Patent Rights (6) Utility Model Rights
(7) Design Rights (8) Trademark Rights
(9) Non-Formality Principle
(10) Neighboring Rights
● (1) human intellectual activities
(2) Copyrights (3) commercial
(4) Formality (5) Egypt Patent Office
(6) economic (7) 20
(8) shape (9) patterns (10) personal

Unit Two - Lesson 3

- (1) d (2) a (3) d (4) a (5) a (6) c (7) b (8) b
(9) a (10) c (11) a (12) d (13) c (14) d (15) b
● (1) x (2) ✓ (3) ✓ (4) x (5) x (6) ✓ (7) ✓
(8) x (9) ✓ (10) x (11) ✓ (12) x (13) ✓ (14) ✓
(15) x (16) x (17) ✓ (18) ✓ (19) x (20) ✓
● (1) quotation (2) commercial
(3) alteration (4) precedence (5) 50
● (1) Credit to creator (BY)
(2) No derivatives (ND) (3) Copyright
(4) Exception (5) Quotation
● (1) conditions (2) credit (3) protection
(4) permission (5) exceptions
(6) necessity (7) quotation (8) source
(9) altered (10) same

Unit Three - Lesson 1

- (1) c (2) a (3) b (4) d (5) c
● (1) ✓ (2) x (3) ✓ (4) ✓ (5) x (6) x (7) ✓
(8) ✓ (9) x (10) ✓ (11) ✓ (12) x (13) ✓

- (14) ✓ (15) x
● (1) safe (2) authorized (3) Trojan horse
(4) spyware (5) ransomware
● (1) Information security (2) Integrity
(3) Cracking (4) Worm (5) Cybercrime

Unit Three - Lesson 2

- (1) d (2) a (3) c (4) c (5) b
● (1) ✓ (2) x (3) ✓ (4) ✓ (5) x (6) x (7) ✓
(8) ✓ (9) ✓ (10) ✓ (11) x (12) ✓ (13) x
(14) ✓ (15) ✓
● (1) password (2) once (3) Authentication
(4) firewall (5) backups
● (1) Password (2) One-time password
(3) Authentication (4) Access control
(5) Firewall

Unit Three - Lesson 3

- (1) b (2) b (3) a (4) a (5) d (6) c (7) a (8) b
(9) b (10) a
● (1) ✓ (2) ✓ (3) ✓ (4) x (5) ✓ (6) ✓ (7) ✓
(8) ✓ (9) x (10) ✓ (11) ✓ (12) x (13) ✓ (14) x
(15) ✓
● (1) fictitious (2) contract
(3) personal (4) shoulder surfing

Unit Three - Lesson 4

- (1) c (2) b (3) a (4) b (5) d
● (1) ✓ (2) x (3) ✓ (4) ✓ (5) ✓ (6) x (7) x
(8) ✓ (9) x (10) ✓
● (1) encryption (2) decryption (3) key
(4) symmetric key (5) session key
● (1) Encryption (2) Decryption (3) Key
(4) Symmetric key encryption
(5) Public key encryption

Unit Three - Lesson 5

- (1) c (2) b (3) c (4) d (5) a
● (1) x (2) ✓ (3) ✓ (4) ✓ (5) ✓ (6) x (7) ✓

- (8) ✓ (9) x (10) ✓ (11) x (12) ✓ (13) x (14) ✓
(15) ✓ (16) ✓ (17) x (18) ✓

Unit Four - Lesson 1

- 1 (1) b (2) b (3) b (4) d (5) c (6) a (7) c (8) c
(9) b (10) b (11) d (12) c (13) a (14) d (15) b
2 (1) ✓ (2) ✓ (3) x (4) ✓ (5) x (6) ✓ (7) x
(8) ✓ (9) x (10) ✓ (11) x (12) ✓ (13) x (14) x
(15) ✓ (16) ✓ (17) x (18) ✓ (19) ✓ (20) ✓
3 (1) internet (2) 13,000 BCE
(3) computers (4) velocity (5) digital divide
4 (1) Hunter-gatherer society
(2) Agrarian society
(3) Industrialized society
(4) Information society (5) Society 5.0
(6) Big Data (7) Artificial Intelligence (AI)
(8) Machine Learning
(9) Internet of Things (IoT)
(10) Digital Divide
5 (1) tools (2) agrarian society (3) after
(4) electricity (5) information society
(6) human (7) Machine Learning
(8) Smart homes (9) Virtual Reality

Test 1 - October

- 1 (1) a (2) b (3) c (4) a (5) d
2 (1) ✓ (2) x (3) x (4) ✓ (5) ✓
3 (1) human life (2) laws
(3) Right to Privacy (4) Image Rights
(5) Publicity Rights
4 (1) Egypt Patent Office
(2) No derivatives (ND) (3) Patent Rights
(4) Utility Model Rights
(5) Credit to creator (BY)

Test 2 - October

- 1 (1) c (2) b (3) c (4) d (5) b
2 (1) ✓ (2) ✓ (3) x (4) ✓ (5) x

- 1 (1) compliance (2) Prior Approval System
(3) Numbers (4) Personal Information
(5) law

- 2 (1) Design Rights (2) Exception
(3) Trademark Rights
(4) Industrial Property Rights
(5) Copyright

Test 3 - October

- 1 (1) a (2) d (3) c (4) d (5) b
2 (1) x (2) x (3) ✓ (4) ✓ (5) ✓
3 (1) Four Basic Items
(2) Law (3) human life
(4) Right to Privacy (5) Image Rights
4 (1) Credit to creator (BY)
(2) Neighboring Rights
(3) Non-Formality Principle (4) Quotation
(5) Economic rights

Unit Five - Lesson 1

- 1 (1) c (2) a (3) a (4) b (5) d (6) a (7) b (8) b
(9) a (10) b (11) d (12) c (13) c (14) a (15) b
2 (1) ✓ (2) ✓ (3) ✓ (4) ✓ (5) x (6) ✓ (7) ✓
(8) ✓ (9) x (10) ✓ (11) x (12) ✓ (13) ✓ (14) x
(15) ✓ (16) ✓ (17) x
3 (1) signal fires (2) drums (3) paper
(4) carrier pigeons (5) 1840
4 (1) Radio (2) Cellular phones
(3) Television (4) Modern postal system
(5) Morse telegraph (6) Telephone
(7) Wireless telegraph
(8) ARPANET

Unit Five - Lesson 2

- 1 (1) b (2) a (3) a (4) b (5) a (6) b (7) c (8) a

- (9) d (10) a (11) a (12) b (13) b (14) a (15) b
2 (1) ✓ (2) x (3) ✓ (4) ✓ (5) ✓ (6) ✓ (7) ✓
(8) ✓ (9) x (10) ✓ (11) x (12) ✓ (13) ✓
(14) ✓ (15) x (16) ✓ (17) ✓ (18) x (19) ✓
(20) ✓

- 3 (1) Communication
(2) One-to-one communication
(3) One-to-many communication
(4) Many-to-one communication
(5) Direct communication
4 (1) Communication
(2) One-to-one communication
(3) One-to-many communication
(4) Many-to-one communication
(5) Direct communication

Unit Five - Lesson 3

- 1 (1) d (2) d (3) d (4) b (5) c (6) b (7) b (8) d
(9) b (10) a (11) a (12) b (13) c (14) d (15) d
2 (1) ✓ (2) x (3) ✓ (4) ✓ (5) x (6) ✓ (7) x
(8) ✓ (9) ✓ (10) x (11) ✓ (12) ✓ (13) x
(14) ✓ (15) ✓ (16) x (17) x (18) ✓ (19) x
(20) ✓
3 (1) images (2) share (3) Video call
(4) log (5) connect
4 (1) Email (Electronic mail)
(2) Broadcast capability (3) To
(4) Bulletin Board System (BBS)
(5) Messaging apps (6) Video call
(7) Blog
(8) Social media (9) Flaming
(10) Fake news
5 (1) text-based messages
(2) broadcast capability
(3) email address

- (4) additional recipients
(5) email addresses
(6) write replies (7) Anonymity
(8) Flaming
(9) immediate response

Unit Six - Lesson 1

- 1 (1) b (2) c (3) d (4) b (5) a (6) b (7) b (8) c
(9) d (10) c
2 (1) ✓ (2) x (3) ✓ (4) ✓ (5) x (6) ✓ (7) x
(8) ✓ (9) ✓ (10) x (11) ✓ (12) x (13) ✓ (14) x
(15) ✓
3 (1) Analog (2) Digital data
(3) A/D conversion (digitization)
(4) Binary (5) Degradation
4 (1) A/D conversion (digitization)
(2) D/A conversion (3) Analog data
(4) Digital data (5) Binary

Unit Six - Lesson 2

- 1 (1) b (2) b (3) b (4) a (5) a (6) a (7) d (8) a
(9) a (10) b (11) c (12) a (13) a (14) b (15) b
2 (1) ✓ (2) x (3) ✓ (4) x (5) ✓ (6) ✓ (7) x
(8) ✓ (9) ✓ (10) ✓ (11) ✓ (12) x (13) ✓
(14) ✓ (15) ✓ (16) x (17) ✓ (18) ✓ (19) ✓
(20) x
3 (1) actual (2) 11 (3) byte (4) 1024 (5) 8
4 (1) Bit (2) Byte (3) Decimal
(4) Binary
(5) Binary to Decimal Conversion
(6) Decimal to Binary C
(7) Kilobyte (KB)
(8) Data (9) Gigabyte (GB)
(10) Subscript 2

Unit Six - Lesson 3

- 1 (1) b (2) c (3) d (4) c (5) a (6) a (7) d (8) c

Unit seven - Lesson 3

- (1) ✓ (2) x (3) x (4) ✓ (5) x (6) x (7) ✓
- (8) x (9) ✓ (10) x
- (1) 0, and 1 (2) true, false
- (3) logic circuit
- (4) truth table (5) 1, 1

Test 1 - November

- (1) a (2) d (3) d (4) c (5) b
- (1) ✓ (2) x (3) ✓ (4) x (5) ✓
- (1) CPU (central processing unit)
- (2) Secondary memory
- (3) Input devices
- (4) Output devices
- (5) Peripheral devices
- (1) D/A conversion
- (2) Kilobyte (KB)
- (3) Hexadecimal (4) Data
- (5) A/D conversion (digitization)

Test 2 - November

- (1) a (2) a (3) c (4) d (5) c
- (1) x (2) ✓ (3) x (4) ✓ (5) ✓
- (1) application
- (2) driver (3) OS
- (4) Android OS
- (5) application
- (1) Binary to Decimal Conversion
- (2) User interface (UI)
- (3) Decimal to Binary Conversion
- (4) Analog data
- (5) Digital data

Test 3 - November

- (1) d (2) a (3) c (4) b (5) d

- (1) x (2) ✓ (3) ✓ (4) x (5) ✓
- (1) 1, 1 (2) inverter, opposite
- (3) single-digit (4) AND, OR
- (5) carry, carry
- (1) Binary (2) Hexadecimal number
- (3) Decimal (4) Nibble (5) Binary

Final exams

Final exam (1)

- (1) c (2) d (3) c (4) a (5) b
- (1) x (2) ✓ (3) ✓ (4) x (5) x
- (1) Four Basic Items (2) carry, carry
- (3) Privacy Policy
- (4) CPU (central processing unit)
- (5) Secondary memory
- (1) Arithmetic unit (2) Telephone
- (3) Hardware (4) Software
- (5) Radio

Final exam (2)

- (1) c (2) b (3) b (4) c (5) d
- (1) x (2) ✓ (3) x (4) x (5) ✓
- (1) information society (2) copyright
- (3) precedents (4) Input devices
- (5) true, false
- (1) Right to Privacy (2) Privacy Policy
- (3) System software (4) Device driver
- (5) CPU (central processing unit)

Final exam (3)

- (1) b (2) a (3) d (4) c (5) a
- (1) ✓ (2) x (3) x (4) ✓ (5) x
- (1) laws (2) spread (3) Output devices
- (4) application (5) logic circuit
- (1) Communication (2) Image Rights

- (3) Publicity Rights
- (4) Operating system (OS)
- (5) Direct communication

Final exam (4)

- (1) d (2) c (3) d (4) a (5) c
- (1) ✓ (2) x (3) ✓ (4) x (5) x
- (1) privacy (2) online bullying
- (3) Peripheral devices
- (4) truth table (5) 1, 1
- (1) Logic circuit (2) Truth table
- (3) One-to-one communication
- (4) Prior Approval System
- (5) Personal Identification Codes

Final exam (5)

- (1) a (2) b (3) d (4) a (5) a
- (1) x (2) ✓ (3) ✓ (4) ✓ (5) x
- (1) longitude (2) disinformation
- (3) driver (4) share (5) OS
- (1) Personal Information
- (2) Four Basic Items
- (3) Email (Electronic mail)
- (4) NOT circuit (Inverter circuit)
- (5) Video call

Final exam (6)

- (1) c (2) d (3) d (4) c (5) c
- (1) ✓ (2) x (3) x (4) ✓ (5) x
- (1) connect
- (2) internet addiction
- (3) conditions
- (4) permission
- (5) Android OS
- (1) AND gate
- (2) Information ethics

- (3) Geotagging
- (4) Half adder circuit
- (5) Email (Electronic mail)

Final exam (7)

- (1) d (2) a (3) c (4) b (5) a
- (1) ✓ (2) x (3) ✓ (4) x (5) x
- (1) credit
- (2) Protection
- (3) application
- (4) Hardware (5) Software
- (1) D/A conversion
- (2) Internet addiction
- (3) Copyright infringement
- (4) Sound
- (5) Binary

Final exam (8)

- (1) d (2) c (3) a (4) b (5) c
- (1) x (2) x (3) x (4) ✓ (5) ✓
- (1) exceptions (2) source (3) 1, 1
- (4) carry
- (5) Frequency
- (1) Disinformation
- (2) Leakage of personal information
- (3) System software
- (4) Sampling
- (5) Operating system (OS)

Final exam (9)

- (1) a (2) d (3) d (4) c (5) c
- (1) x (2) ✓ (3) x (4) ✓ (5) ✓
- (1) necessity
- (2) quotation
- (3) inverter, opposite (4) Analog
- (5) Encoding

Programming and AI

- ❶ (1) Cybercrime (2) Identity theft
- (3) Device driver
- (4) A/D conversion (digitization)
- (5) Quantization

Final exam (10)

- ❶ (1) a (2) b (3) c (4) a (5) d
- ❷ (1) x (2) ✓ (3) ✓ (4) ✓ (5) x
- ❸ (1) human life (2) per second
- (3) Image Rights (4) single-digit
- (5) Digital data
- ❹ (1) Frame rate (2) Sound
- (3) Pulse Code Modulation (PCM)
- (4) Video
- (5) Quantization

Final exam (11)

- ❶ (1) c (2) (3) a (4) b (5) a
- ❷ (1) x (2) ✓ (3) x (4) ✓ (5) x
- ❸ (1) laws (2) AND, OR
- (3) Right to Privacy
- (4) altered (5) same
- ❹ (1) Compression
- (2) Information design
- (3) Decompression
- (4) Pixel (5) Sampling

Final exam (12)

- ❶ (1) d (2) b (3) b (4) b (5) c
- ❷ (1) ✓ (2) x (3) x (4) ✓ (5) ✓
- ❸ (1) Publicity Rights (2) Numbers
- (3) CPU (central processing unit)
- (4) Secondary memory
- (5) Encoding
- ❹ (1) Pixel (2) Resolution
- (3) Huffman coding (4) Abstraction

(5) Pictogram

Final exam (13)

- ❶ (1) d (2) a (3) d (4) a (5) d
- ❷ (1) ✓ (2) x (3) (4) x (5) ✓
- ❸ (1) compliance
- (2) Prior Approval System
- (3) Output devices
- (4) Peripheral devices (5) 2
- ❹ (1) Icon (2) Resolution
- (3) Lossy compression
- (4) Visualization (5) Pixel

Final exam (14)

- ❶ (1) d (2) a (3) a (4) b (5) d
- ❷ (1) ✓ (2) x (3) x (4) ✓ (5) ✓
- ❸ (1) Personal Information (2) law
- (3) Input devices
- (4) single-digit (5) 0, and 1
- ❹ (1) Gradation
- (2) Run-length encoding
- (3) Visualization (4) Encoding
- (5) User interface (UI)

Final exam (15)

- ❶ (1) a (2) c (3) c (4) a (5) c
- ❷ (1) ✓ (2) (3) x (4) ✓ (5) ✓
- ❸ (1) directly (2) consent
- (3) Control unit
- (4) Main memory (5) NOT
- ❹ (1) Additive color mixing
- (2) Huffman coding (3) Icon
- (4) User interface (UI)
- (5) Hexadecimal

Best wishes for success